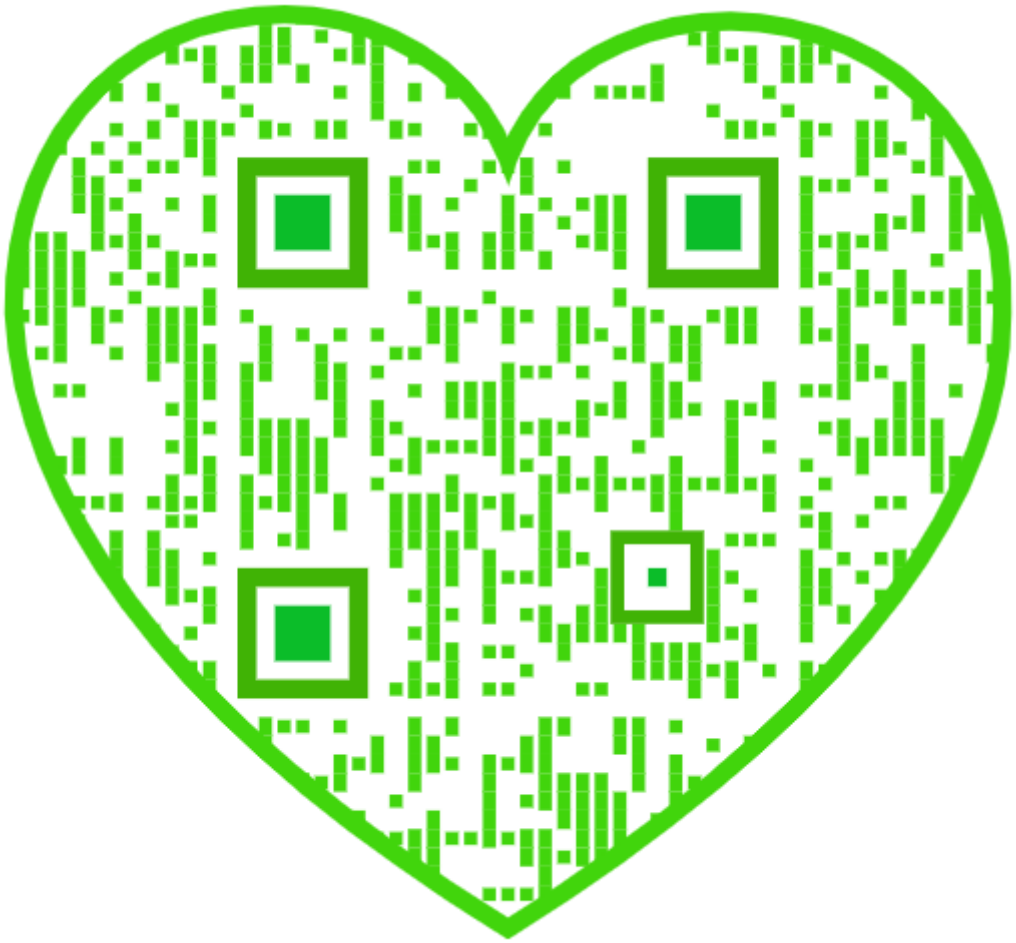

ROWING AND SCULLING.

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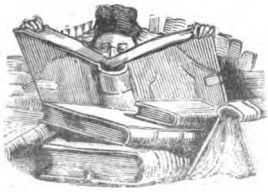

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ROWING AND SCULLING.

CHAPTER I.

INTRODUCTORY.

It is anomalous that of the hundreds of amateurs who have in their day passed through the ordeal and experiences of rowing and training, two only have been found to offer to succeeding generations the benefit of their own practical experience, and still more that these should be, not ex-competitors with the oar in University or Grand Challenge Races, but the one a coxswain, *pur et simple*, and the other a sculler, at the top of the tree in that line, but who never aspired to any prestige with the oar. For this reason alone there would seem to be space left for the practical experiences of rowing and training for a University or a Grand Challenge race, or of the coaching of various crews for various races.

While it is intended here to discuss the whole art and its concomitants from first principles upwards, it must not be supposed that these chapters are capable of, or aspire to, teaching rowing from first principles to a tyro who has never handled an oar. Some writers on the subject have attempted such a style of education, commencing even with an abstract definition of what rowing or sculling, as the case may be, consists of.

To economise time and space, we may as well premise that we do not here write to those who have never handled an oar. That would be as hyperbolical as to teach swimming by book work, or by observation on dry land of the action of a frog in the water. One lesson of a practical order from a most mediocre oarsman would be worth all the book work of every oarsman who had ever won a blue ribbon at Putney or gold medal at Henley. We therefore premise that we write as ἴδοτες ἴδοσι: that those who read these pages, and seek to make any trial of the experiences that, with all due deference, are herein offered, have already had an oar in their hands, and have to some extent mastered the rudiments of the art. But though we do not write *to* the utter tyro, we none the less write *for* him, *i.e.*, to the coach who is to instruct him. This especially must be borne in mind in reading the pages which relate to the first principles. They are written, not to teach the tyro himself, but to suggest to his tutor the simplest plan of teaching him.

More or less, this principle may be borne in mind throughout the "rowing" part of the work, that these observations are more likely to bear fruit upon an oarsman through the medium of his coach than by any direct light they may throw upon his own mind; for all rowing is more or less mechanical—a reflex action, which, though originally set in motion by a distinct volition, has become so stereotyped in the senses, that so far from requiring a distinctly conscious volition to repeat it in its normal form, it at last rather requires a distinct volition to take it out of its old groove, and to mould it in any other shape or action. We mean this—not that a man is unconscious that he is rowing or requires no distinct volition to make each stroke, but that a man is to a great extent unconscious of the details of his

form when once he becomes settled in it, good or bad. These details were originated by distinct volitions, but a series of actions of a similar nature, repeated, form a habit, which habit then reproduces, without any strain of will, the very class of action which originally formed it, so that at last it becomes a sheer effort of will to act contrary to the habit thus formed.

The explanation sounds prolix, yet it may be of value in two ways :—1. To show that an oarsman might read and understand a treatise on form and faults in rowing, be quite competent to form an ideal to himself of what rowing should be, and to "spot" faults in another; but be unconscious himself as to his own form, and of his own commission of the very faults he is reading of, unless the error was most glaring. And further, even where informed of it, his memory would not remain at tension, constantly thinking of the fault and its remedy, unless reminded from some external source while rowing. 2. To show to coaches the importance of studying details early in a tyro's career—not to leave him unattended to pick up haphazard form and faults in light boats beyond his skill; and to remember the old maxim, that it is usually easier to teach a tyro from first principles than to coach a semi-proficient, who first requires to be untaught all the faults in which he has hardened.

For these reasons, these chapters on rowing are written, from first to last, more to those who teach rowing than to those who are engaged in learning. The latter can learn more in an hour's practical lesson than from a year's study of book work. With regard to those chapters which treat of training, they can, of course, be entered into directly by the oarsman himself as well as by his coach.

Inasmuch, therefore, as the first half of this work is addressed to coaches rather than to oarsmen directly, it

may be well to commence with a few general words of advice to the former before entering into detail of different features of rowing faults and excellences :—

1. Keep your temper.

2. Remember that the best coach is not necessarily he who knows most and has the largest stock of practical knowledge for his own purposes, so much as he who has the facility of imparting to others the benefit of that which he does know. Therefore,

3. Be lucid; and if a pupil does not seem to realise your definition of a fault or excellence in one form of words, seek to express it in another. Analogies will go far to express this.

4. Demonstrate practically a fault as well as an excellence. Many a pupil errs unconsciously, but would at once appreciate an illustration of what he is doing wrong, and learn as much from that as from a mere illustration of what he ought to do.

5. Trace faults to their origin, distinguish between cause and effect, and coach the former—*e.g.*, if a man is too soon or too late in the stroke, instead of simply saying, "Late, No. —," or "Too soon —," point out at first what action of the body it is that leads to error—raising the hands too late, or "bucketing" forward in the swing (of this more anon, in a later chapter). This once explained, the more concise reminder of the effect of such a cause may do what is wanted, supplemented with an occasional recurrence and reminder of the cause.

6. Avoid generalities in coaching, unless it is a fact that a fault is really common to a whole crew; and even then eight individual addresses, one to each member of the crew, will have more effect than eight general admonitions applied *en masse*.

7. Note how each pupil progresses from day to day or hour to hour, and inform him. It goes a long way to encourage him to be told that, bad as he is, he is not so bad as he was; or if he has suddenly generated a fault or lapsed into an old one, the sooner he is told the better.

8. Some coaches advise riding and some running, some the stern of the boat, as the best place wherein to criticise. One authority states that a running coach has only to look after his crew, therefore less to distract him. But advice and doubt in this respect, between running and riding, must depend upon the coach's capacity, pedestrian or equestrian. A bad rider on a troublesome hack will be more distracted thus than with the difficulty of picking his footway on a towpath. But, in any case, coaching from the boat should, to a great extent, alternate with inspection from the bank. So long as an oarsman is practising in a "gig" boat this is easy enough. When he progresses to a light boat, towards the end of his training, an occasional paddle in a gig pair is the only substitute. The variation of view from one motion of the body to another throws much light upon faults and their causes, and opens the coach's eyes. Especially in deciding between the merits of two men for a place in a boat, it is as advisable to have an inspection from boat as from bank.

9. In coaching an eight or four, the time of the oars, unless there is some very glaring discrepancy, is best left for the coxswain to remark upon, as he is better placed for observation, and also sets the coach free to note other matters. At the same time, the tracing of cause, (the coxswain having noted the effect,) and the explanation how to cure the fault, should come from the coach

10. Though bad workmen are always prone to grumble with their tools, the coach should not turn a deaf ear to

complaints of discomfort or awkwardness of work until he has carefully inspected, or even personally essayed, the seat in the boat in question. A large proportion of faults may be traced to the boats or oars which tyros use. They are too often set down to row in some worn-out craft from a boat-yard—rowlocks worn and grooved, oars screwed and sprung — and are blamed for awkwardness, rowing deep, screwing, etc. A finished oarsman will at once detect errors in his tools; the tyro cannot; he can only blunder and grumble. Meantime, having accommodated himself to circumstances during his earlier lessons, he often contracts from such craft faults which might have been obviated from the first by due inspection. More depends upon this than many coaches imagine. They may scold for a month, where five minutes' examination and trial of a pupil's seat and oar would have at once traced the evil and produced the remedy. Even when a tyro makes no complaint, it by no means follows that his work is well laid out. He may be diffident and painstaking, unwilling to complain, or, from having "accommodated himself to circumstances" in bad boats previously, may be more at home with his bad work than with it properly laid out. Especially if he has been rowing with too low a rowlock, and in a rolling boat, and still more if he has a sluggish recovery, is he certain to set his stretcher too long, to enable himself to clear his knees. In this point a coach should be obdurate and autocratic. Not half the college-eight oars of a season know what is the right length of stretcher for themselves. Their tendency is to have it too long. A coach should arbitrarily regulate the stretchers, and turn them a deaf ear to "I can't." The latter phrase should have no existence in a pupil's vocabulary on the river.

11. Nor should the coach accept the fallacy of boat-

builders, that the work in a boat should be laid out the same for a whole crew. It should be adapted to each man's rowlocks, more or less, as well as stretchers. That coach will get most out of his men who can so regulate their work. It is preposterous to suppose that 6ft. 2in. men should row with the same work as a 5ft. 6in. man. Yet builders, though they concede a variation of stretcher, ignore that of rowlocks. The latter should vary slightly, according to the height of the man in the boat, and according to the *slope of his shoulders;* also, in some cases, even according to his style. For though theoretically there is but one perfect style of rowing, yet practically variations of physique do to some extent modify style in the individual, and, with it, demand modifications of work. Details of work, and the best plan of laying it out, will occupy a subsequent chapter.

12. There should be only one voice at a time on the bank, nor should the coach be changed, if possible, when a crew has once embarked in training. He who has watched the river from day to day is the best judge of the progress or deterioration of individuals, and as different coaches essay to explain and correct the same fault by different method and analogy, the variation often confuses rather than enlightens the pupil. One coach may undo the work of another, though each, if left to carry out his own system, could do well enough. Were all coaches omniscient and omnipotent, one would do as well as another; but so long as they are mortal, each is best left to carry out his own system of instruction, unless an important change for the better can be found. At the same time, a coach will find that he himself gains hints from the occasional inspection of a fellow-labourer who will communicate his views and observations to him, even though the latter be confessedly the less experienced mentor. A coach, like his crew, is apt to

run too much in one groove, to let certain points escape his observation, to lay so much stress upon some crying fault, that he blinds himself to some minor evil. Of the two, the regular coach will, of course, know far more about his crew than the casual comer. The latter may note that the coach has not found fault all day with a man who commits some error. The explanation may be that the coach is, for all that, watching the man, believes that he is daily improving, and that he is conscious of his own fault, and gradually remedying it. Yet, *per contrà*, a casual coach will hardly ever visit a crew without being able to "spot" some point worthy of observation to which the regular coach is unconsciously blind, till it is thus brought to his notice. And the point may be one which in another crew the regular coach, as an interloper, would be the first to observe. Such is the result of stereotyped actions from day to day.

To standard coaches, whose names are household words, these observations will be as coals to Newcastle. Yet inasmuch as their task is rather to take in hand finished oars for important races, not having time to teach tyros *ab initio*, and whereas the ranks of amateurs are greatly recruited by cadets taught at first only by oarsmen who, to tyros, are comparatively proficients, yet are themselves lacking much tuition ere they could attain Henley or Putney form, these introductory remarks may not be out of place. Details of form, style, principles, faults, and remedies will occupy subsequent chapters.

CHAPTER II.

COACHING A TYRO FROM FIRST PRINCIPLES.

A GIG slightly outrigged is the best in which to teach an utter tyro, unless one be found with considerable more beam than the ordinary length of an oar in-board. Ordinary in-rigged gigs have but little to spare between the thowl and the handle of an oar when laid in the rowlock, and a beginner, who is at all awkward with his elbows, or draws his button away from the rowlock in recovering (a most probable fault), stands in jeopardy of a knock on the funny-bone or knuckles against the opposite thowl-pin, which fidgets him nearly as much as a touch of the splinter bar upon the hocks would a colt in harness. The oar should be carefully examined by the coach. It cannot be too good or too "true," *i.e.*, lying square in the rowlock. A good oarsman will adapt a bad oar to circumstances, and still make it go true. A tyro adapts circumstances to his oar, and moulds his earliest style thereby. The oar should neither be weak, or it will go deep, or hog-backed (as builders often turn them out for sake of stiffness), else it will fly out of water till the strain has straightened it; and, lastly, the loom should be true and square, which is often not the case, and oarsmen puzzle to know why they row deep with such an oar. The rowlock should also be examined. In most hack gigs the width between thowl and stopper is not sufficient, and the oar "locks" to a full reach forward. Also, if the rowlock has been used much, the upper part of the thowl, instead of being flush and "proud," (*i.e.*, raking slightly forward), will often have a groove in it, transverse to the perpendicular of the thowl, especially where it has

been used by one who feathers at all under water. Into this groove the upper angle of the loom of the oar lapses, and the blade slopes in the water and sinks deep. Any such groove should be filed away at the outset. Again, a weak iron often gets pulled out of shape, the sill of the rowlock sinks at the thowl end, the loom of the oar thus rows up-hill, and the blade sinks too deep; or the button gets worn, so that the outer flange of it no longer presses against the thowl after the first grip, but leaves it when the oar approaches its right angle to the rowlock during the stroke. A careful coach will inspect each of these details before starting, and thereby save himself at least from the trouble of preaching against the valid quantum of error of style which they would engender.

Stretchers are, as a rule, made too perpendicular; this alone, apart from the early difficulty of clearing the knees, teaches beginners, if left to judge for themselves, to set their stretchers too long, so that the heel may reach the board without cramping the flexor tendon of the foot that runs down the shin bone. The coach should be arbitrary in fixing the length of the stretcher, while the addition of a piece of wood under the heels will remedy the fault of the builder.

A beginner should learn with a rowlock one inch, or more so, higher, compared with level of seat and water, than would be his work in a racing boat. When he has once learnt to clear his knees, and avoid crabs, it will be time to lower his work. At the same time the rowlock should never be so high as to throw the strain almost entirely upon the arms, and to obviate use of the loins, as in a sea-boat. One of the best amateurs of his day, now retired, swears by a smooth oar handle; *chacun à son goût;* however, in nine cases out of ten a rasped handle is most comfortable, strengthens the grasp, and saves blisters.

The stretcher strap should hold *both* feet, and it is best if each foot is in a separate loop. Most boat-builders disregard this, and even when building a racing-boat seem to imagine that, though a man uses both feet during the stroke, one will suffice to aid his recovery. A beginner should learn in the straps; such is my humble opinion, though I can well remember that it used to be recorded as a maxim when I first went to Oxford that a man should learn and be capable of rowing without a strap. A man who has rowed much should have developed sufficient strength of abdominal muscle to enable him to do ordinary gig rowing without a strap, and yet not to double over his oar or to hang in recovery. But till that muscle developes it is best to supply the strap at all times, lest the beginner should learn to meet his oar, or be unable to row the stroke out for want of power of recovery from beyond the perpendicular. If, however, it is seen that he tries to recover solely with the instep from the strap, and not also with the muscles of abdomen, loins, and thighs, his strap may in such a case be taken away for a short time to compel him to use all muscles requisite for a good recovery. The strap should be tight enough to grasp the foot, instead of pinching it. The coach will regulate this.

The seat in the boat, *i.e.*, the way in which to sit in a boat, requires careful inspection, and yet is one for which a definite rule cannot well be laid down. Some of the best oars sit almost on tiptail; some, *per contrà*, sit at least three, if not four inches on the seat. Much depends upon the depth at which the hip is set up the body, along the flank, and consequently upon the play of the joint on the seat. A man must regulate his seat to some extent according to his make and shape; but if a nominal depth of seat is to be laid down for a tyro it may be three inches for a heavy

weight to two and a half for a light weight. But in any case the oarsman should sit square, as if he were unconscious which side he was going to row. His oar-handle should overlap the outside of his chest about one inch (on a fixed seat, of which at present we are speaking). If he sits square, plants his feet square, and sets his hands square, he will have no excuse for not rowing square. The heels should be together; the straps should allow of this, but the toes should slope outwards, as in a dancing-master's first position of dancing.

More depends upon the grip of the oar than most coaches are aware of. Half the faults in a crew may often be traced to a faulty grasp. A tyro is too often told to "take firm hold of his oar," and in implicit obedience he clutches it as if it were his worst enemy, which he wishes to strangle (fig. 1). Now, as the stroke is rowed through, the angle of inflection of the wrist gradually alters. At first the whole arm and wrist are extended in a straight line. When the arms begin to bend at shoulder and elbow, towards the latter part of the stroke, the wrist has to accommodate itself to the flexion of the other joints, so that the knuckles and palm may constantly remain in the same plane, and with them the blade of the oar at the same constant angle to the surface of the water. To effect this, the wrist has to bend, not only perpendicularly, but also laterally; for the elbows, as they pass the ribs, are wider apart than when extended at the commencement of the stroke; and as the hands (as will be seen presently) do not grasp the oar at a width apart equivalent to the width of the ribs, and have, moreover, to keep always flat to the handle of the oar, the angle of which to

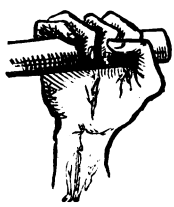

Fig. 1.—Wrong.

the body is constantly changing, the angle of the wrist must vary also laterally as well as perpendicularly; that is, the palm of the hand must remain in a constant position, though the position of the arms is inconstant, and the wrist is responsible for the arrangement.

If a man clenches his fist tight, and then tries to shake his hand from the wrist, he will find the latter joint cramped instead of limp, as required for the operation. Again, if a man wishes to hang by his hands from a bar, he will do so from the two upper joints of his fingers, hardly bending the lower knuckle joints at all. If he essay to clench the bar, he will only cramp his grasp, and weaken his powers of suspension. These two points will show the folly of grasping the oar with the whole hand, and the impolicy of using to a tyro the too common expression, "Grasp your oar firmly," as liable to misinterpretation.

The hands should be placed upon the oar rather less than a hand's-breadth apart—about three inches (not one to two inches, as one book authority teaches, for that does not give play enough for the elbows to finish close to the ribs, by use of the shoulder muscles). Thus the two upper joints of the fingers should perform the grasp, the lower joints being left nearly straight. The hand should not hold the oar as if squeezing a sponge. Then the thumb should close and grip, but only so far as it can without compelling the lower joints of the other fingers to join in the grasp. The latter joints should bend only so far as to accommodate themselves to the roundness of the oar; hardly at all, in fact. The grasp thus attained is quite strong enough for all rowing purposes. The lower part of the palm of the hand and the ball of the thumb should

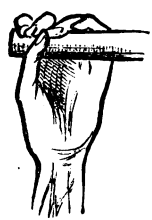

Fig. 2.—Right.

not touch the oar at all. The hands will thus be in that position which gives freest play to the wrist of any grasp, and also in that in which a man, if intending to hang his whole weight upon a bar, such as the handle of his oar, would instinctively adopt (fig. 2).

The absence of cramp in the grasp and the free play to the wrist thus attained will facilitate the action of the feather, and will, by enabling the oarsman to accommodate his wrist without cramp or hindrance to the variations of angle of the other joints of the arm, and of the oar-handle, keep him clear of much of that want of command of oar and of rowing deep which is the bugbear of beginners, and which is to a great extent to be traced to the erroneous manner in which they are taught to "grasp" their oars.

It is true that some men prefer to hold the thumb of the outside hand over the oar, instead of underneath it, but there ought to be no choice in the matter; both thumbs should be underneath (in rowing). Any other hold of the oar is a fault. One text-book on rowing enunciates a dangerous theory, which, putting the most charitable construction upon it, not of unorthodoxy, but of ambiguity, is liable to various misinterpretations by beginners. The authority in question says, "The outside hand does the greater share of work in the bare pulling." If it is meant by this that the outside hand should exercise the greater pressure upon the oar, the doctrine is *primâ facie* wrong. A man who tried so to do would screw, and could not row with his whole force. Both hands, both arms, both shoulders, each loin, both legs and feet, should bear an equal strain throughout the stroke. The physical exertion of each side of the body, and of the members belonging to it, should be equal while rowing the stroke through. But though the *physical* strain is equal to both hands, it is true that the *mechanical* power of that hand

which is farthest from the fulcrum is the greater of the two. In that sense the outside hand does most work, in that its work, though equal to that of the others, is expended to greater advantage. Assuming this to be the meaning of the text in question, no greater censure need be passed upon it than that of dangerous ambiguity.

We have said that the oarsman should sit square. His shoulders should be set well back and stiffened. Any attempt to stretch them as he reaches out, and so to add to his reach, loses more than it gains. Without entering into anatomical reasons, it is well known to every rowing man that the shoulders so stretched lose rigidity, and stretch still more under the strain of the strokes, and the tautness of the grip of the water is marred.

But when an oarsman is told to reach out "square," it after all comes to reaching as square as he can, and that is all. The best form that ever rowed always "gave" a little, however little, to the side on which he rowed. From a front view his shoulders would look square enough, but from behind it would be seen that the two shoulders were not quite in the same position, for the arm of the one is stretched away from, and the other across the body, to follow the arc of the oar-handle at the commencement of the reach. But this concession, that absolute sculptural squareness is not to be looked for in the reach forward, must not be taken as any excuse for bending one shoulder or rowing across the boat—too common a fault with many good oars, sevens especially, when they have rowed long in the same place, and have learnt to keep the head to one side, to follow the back of stroke, who does not sit opposite to them. But of this more in detail in a subsequent chapter.

Cushions are now almost obsolete, and even those who once swore by a new wash-leather cushion to row upon, do

not now lament the abolition. True, the seat is harder, but though, till the bones get accustomed to it, that is rather uncomfortable, the "raws" that used to be the bugbear of so many practical oars when rowing in a rolling boat are now seldom complained of. Moreover, by sitting lower without cushions the tyro is enabled to row with a lower rowlock, and to lower also his centre of gravity, and therewith to reduce the propensity to roll. A wet cushion would draw and rub raw even a man who on a dry one never encountered a "raw," and in a sou'-wester round Nuneham Island, or at Putney in Corney Reach, the steadiest eight would ship enough water to saturate every cushion on the side nearest the outrigger against which the water sluiced into the boat.

For these reasons it is as well nowadays to teach a tyro from the first upon bare boards, and before long the practice of bruising will wear off, while that of raws will hardly, if ever, be experienced. Having thus far explained the prior arrangements of seating the tyro in a boat, and teaching how to hold his oar, the next chapter will detail the best way of setting him to work, supposing him never to have had an oar in his hand before.

CHAPTER III.

COACHING A TYRO—REACH—FINISH—FEATHER.

So far a tyro has been taught to sit in a boat, and to hold his oar. If he does these two preliminaries squarely and properly, he starts fair to swing squarely and to use each limb of his body evenly when he commences to row.

The usual manner in which an utter beginner is taught to row is by setting an experienced oarsman in front of him,

and telling him to copy his action, admonishing at the same time each error as exhibited by the beginner in his attempts to copy his model. With all due deference to generally received practice, this does not seem the speediest way of inculcating the first things which a tyro has to learn, viz., the use of his back and legs as the main machinery in rowing the stroke. A man who has never rowed has been accustomed to use his arms, and arms only, for all purposes of moving or controlling heavy weights, and accordingly the first instinct of the beginner in rowing is to attempt to move the oar with his arms. The use of his back, loins, and legs with him is only secondary, unless, which is unlikely, he has been in the habit of driving a heavy-pulling four-in-hand team. The use of the arms in rowing is too natural not to come sooner or later, when once called into play, and a tyro learns quickest how to make most use of those parts of his frame in which his greatest strength lies, if taught at first to move his oar without any action of the arms, simply from his back and loins.

Again, the muscle most commonly used to bend the arms, and to draw them into the body when a weight is attached to them, in ordinary pursuits, is the *biceps*, the *ne plus ultra* of novelists and those who do not understand rowing and athletics generally. The man who finishes his stroke by aid of the *biceps* infallibly dog-ears his elbows, and sticks them out at right angles to his ribs, giving a weak as well as a cramped and ugly finish. The stroke should be finished with the shoulders and the muscles that work them, and the biceps should be passive throughout the stroke. The best way to make a man use his shoulders instead of his biceps is to accustom him to feel a strain upon the former.

Therefore, having got a beginner on his seat, and having

taught him how to hold his oar, let him be made to reach well forward, with the boat at a dead pull—no "way" upon it—and then to row a stroke solely with the body swinging and legs driving against the stretcher. The arms need not at first be bent at all, but kept out rigid, like taut ropes coupling the body to the oar. The heavier the boat is at this period the more will the beginner appreciate the novel use of his legs and loins, from the resistance to them. An extra sitter in the boat is a gain in this respect. If the boat runs too light, and the oar comes too easily through the water, the pupil finds no resistance that his arms cannot easily overcome, and at once instinctively tries to do his work with them. Besides, by thus keeping the arms rigid, the oar is sure, if truly held at first, to remain square in the rowlock, so that there is no rowing deep, a fault that is sure to result if the arms are at once called into play before the wrist has learnt to accommodate itself to the variation of angle referred to in the previous chapter.

After a few minutes' body work of this sort the finish of the stroke with the shoulders may be explained, and copied by the pupil from the model in front of him. But from day to day, as the lesson commences, a few body strokes, with rigid arms, should be rowed to start with, to recall the use of the loins, till the pupil has learnt thoroughly to depend upon that part for the strain of the stroke. If the coach has to deal with a half-taught pupil, whose fault is too lavish a use of his arms, a few such strokes as this, enforced with rigid arms, will go far towards throwing new light upon the subject, and teaching him how to make right use of his body.

Next, to teach the finish. Let that be taught separately. Let the pupil be shown the proper action, and made to copy it without an oar in his hands; by setting his arms out straight in front of him, knuckles uppermost, then swinging

them in to his chest by use of the shoulder muscles, bending the elbow joint as the arms come in, so as to keep the hand in the same plane, till the *root of the thumb* strikes the chest. Having copied the action properly for a few times, let him sit upright on his seat, repeat the same with the oar in his hand, and not passing through the water at first. Subsequently let him row the finish only, of a stroke in the water, without feathering, but dropping his hands after the chest is touched. When he has done this cleanly, let the two parts of the stroke be put together. A pupil who has begun in this fashion will be using his body and finishing with square elbows days and weeks before another who has simply been told to "copy a model," and who has from the outset sought to do his work with the "handiest" part of his frame, the arms.

The feather is the last thing to be learnt, and will be acquired all the more accurately in the long-run for being made a separate piece of tuition, and not at first attempted simultaneously with the rest of the stroke. The second or third day's lesson will be time enough for this stage. During the earlier lessons the pupil will have been taught to drop his hands at the end of the stroke, so as to clear the water; and, inasmuch as in the feather the drop should come before the turn to avoid feathering under water, the proper sequence of the different actions will be best inculcated from the commencement by the order of the lessons. As each new detail is studied, the pupil will be taught to add it to what he has acquired before, till the whole stroke has been taught. The feather, like the finish, is quickest taught by commencing without an oar in the hand, studying the action only at first; that is, it is by this means most speedily acquired in a clean and perfect shape. If taught all at once, faults may creep in from misappreciation of the manipulation, which may take days or even months to eradicate.

The thumb at its base should be the part of the hand which strikes the chest at the conclusion of the stroke, knuckles being uppermost; the stroke thus is rowed in the water to the last. Then the hands should drop sharply about two inches and a half, the base of the thumb still touching the chest, and *then*, when by this means the oar has been raised edgeways like a knife out of the water, the turn of the wrist should take place. A few minutes' practice of the action, slowly, with a stick held in the hand instead of an oar, at first, will explain and define the action. Then the three motions—the touch on the chest, the drop, and the turn—can be accelerated in their sequence till they approach the style of an ordinary feather. Then the same should be repeated with the oar in the hands, only just rowing the last foot of the stroke, till the motion becomes handy. A quarter of an hour spent by the coach in this manner will save ten times the waste of time in subsequent crabs and scoldings.

Too much attention cannot be paid to a neat and clean feather, the oar coming out of the water edgeways, and hands dropped *before* they are turned. If the hands are turned before dropped, the oar is turned in the water, and when the hands drop it is pushed up flatways through the water. The resistance of the element causes a strain upon the sill of the rowlock, and tends to drag the boat down on that side. Half the faults in rowing may be traced to a feather under water; the boat, if a light one, is made to roll thereby, and the form in turn is cramped by unsteadiness. Again, the oar does not come off the chest so freely when encountering resistance in the water by being brought out flatways, so that recovery is hampered instead of being elastic. Then, if a man thus hangs at the chest, he wastes time, and has to rush forward in his swing to make up his

lost ground. This spoils his swing, and taxes his endurance by the extra exertion of the "bucket" forward, and probably throws him out of time into the bargain. Last of all, the resistance of the oar against the water, when forced out flat instead of edgeways, more or less backs water, and stops the way of the boat.

If coaches would pay more attention to curing faults of feather they would have fewer other faults to reform in those under their charge. In the same way that a few distinct "body" strokes should during early lessons commence the day's practice, so also should a minute or two of practice of the action of the feather without rowing, to recall the knack before settling down to work. Time thus spent will be time gained.

A text-book on rowing (already referred to as containing erroneous definitions and doctrines) gives the following pernicious and self-contradictory definition of a feather:—"The oar should be brought straight home to the chest, the knuckles touching the body about an inch or less below the bottom of the breast-bone, where the ribs branch off; thus every inch of water is made use of. When there the hands should be dropped," etc. This definition is wrong, in the use of the word "knuckles" (fig. 3). It is, as explained above, the root of the thumb that should first touch the chest. If the knuckles touch the chest *before* the drop, one of two faults must have happened. Either the oar at the moment the knuckles reach the chest is in the water, or is out of it; if in the water, then the action of touching the

Fig. 3.—Hands turned before dropped (wrong).

chest with the knuckles has turned it in the water, it is feathered under water; or if the oar is *not* in the water, the hands have been lowered from their original plane before the oar reached the chest, so as to elevate the oar from the water; in that case the last part of the stroke, more or less, has been rowed in the air, not in the water, and thus every inch of water is *not* made use of; and if the oar is thus out of the water already, a further drop is superfluous.

The test of a clean feather is the touch of the root of the thumb first against the chest; this ensures that at least the oar has remained square to the end of the stroke; and if the hands preserve the same plane till after the chest has been thus touched, the oar will remain not only square, but in the water to the last, and therefore doing work. The drop instantaneously elevates it from the water, and the turn which follows completes the feather (fig. 4). However rapidly the three actions follow in quick rowing and recovery, still, upon analysis, the sequence should always be that here defined. It is a common thing for a coach to attempt to teach rapidity of feather by telling his pupil to turn and drop his hands "sharp and together," something in the style of the text-book here quoted, hence the two motions get confused, and too often transposed, the result being a feather under water, or at best, a waste of some of the finish n the air. When the hands work the motion quickly the eye will not detect, by merely watching the hands, any transposition or amalgamation of the motion, but a glance at the oar will answer the question. 1. If the oar

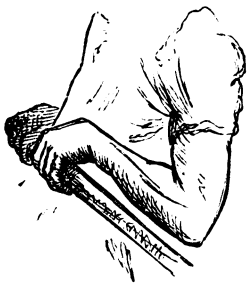

Fig. 4.—Hands dropped before turned (right).

is feathered perfectly it comes out like a knife, leaving a small swirl where it has made its exit. 2. If a sort of feathery sheet of water runs off the blade as it leaves the water, it is feathered under water, the hands have turned while the oar is still in the water, and the oar, coming up spoonways, empties its contents as it reaches the surface. 3. If the oar throws a slop of water aft as it leaves the water, the stroke is finished in the air, and a gradual drop of the hands has taken place before the hands reach the chest. That drop has come too soon, the hands have not preserved their plane.

Many good oars are, nevertheless, to be seen who neither feather under water nor throw up a fountain after, and yet touch the chest first with the knuckles, and not the thumb. What they do is this, they complete in empty air, an inch or so before they touch the chest, the evolutions which they should perform touching the chest; they do these in the proper order, but too soon, thus they have the hands dropped and oar feathered before the hands reach the chest, and consequently, the last few inches or so of the journey of the blade are performed edgeways in the air. This loss of work may be too infinitesimal to be worth fussing a man about so long as he feathers clean. At the same time a tyro had better be taught in the way above described, for thus not only will he not waste even these odd inches of stroke, but also by making a rule of touching his chest with the base of the thumb he will have and exhibit a distinct test of clean feather, instead of a guess-work arrangement of the motions of the wrist in empty air.

In the above quotation from the text-book alluded to, mention is made of a distinct spot to which the oar should be brought on the chest. This is wrongly put as a piece of coaching. The hands should be brought in to whatever

part of the chest is at the moment of the finish in the plane in which they started, and in which they should have remained through the stroke, so as to preserve an even depth of the oar. If a man finds out a spot on his chest not in that plane, he must at the finish raise or lower his blade to the wrong level in order to touch that spot. But it should be the care of the coach to see that the work is so placed, that when the oarsman is back at the finish of the stroke the handle of the oar should be at the bottom of the breast-bone. But a direction to a coach, such as this, becomes mischievous if directed to an oarsman himself, who must finish as his work leads him, and not as he listeth.

The erroneous views in the text-book in question are here criticized and exposed at length, not only to correct misapprehension and mischief, which they may have disseminated, but further, because it is possible that the same mistaken definition which has suggested itself to one adviser may spontaneously be adopted by others when coaching, unless anticipated and disproved.

So far we have analyzed the body work, arm work, and wrist work of the stroke separately. The combination of the three, and the recovery after the stroke, will occupy another chapter.

CHAPTER IV.

USE OF THE LEGS—RECOVERY—CATCH OF THE WATER.

So far we have analysed each of the motions of the body, arms, and wrist, from the time when the water is first laid hold of at the commencement of the stroke up to that instant when the hands have turned at the chest, and have feathered the oar after it has quitted the water. When the

pupil comes to put these three motions together he will have got a complete stroke.

Hitherto we have said nothing about the use of the legs, though they play a most important part in the strength of the stroke—and for this reason, that the legs, after all, are only used because the body is used; and, if a beginner is urged at once to specially use his legs, before he has acquired some use of his body, the chances are that he uses his legs too soon, at the wrong time, and in the wrong place. He will not, because thus not especially urged to use his legs at first, row as if he had no such limbs; instinctively he will use them from the outset, if taught to commence with mere "body" strokes, such as described in the last chapter. And when he has begun to appreciate the use of his body, and to depend upon it as the main motive power in the stroke, he then can be taught to apply extra power with his feet at the right time, to increase the power and swing of the body. But nothing is more invidious than to tell a beginner, before he learns anything about a stroke, to "kick against his stretcher." If he does so, he is sure to kick too soon, and simply to push himself back on his seat before he has got his oar in the water. The legs instinctively stiffen themselves against the stretcher the instant that the body feels the strain of the oar. They should be kept in this rigid posture, supporting the body throughout the stroke. This rigidity should commence at the instant the oar touches the water, and the strain begins to fall upon the shoulders; not sooner, or the seat is shifted; not later, or the tension of the body slackens for want of support; a passive resistance, co-extensive with the strain upon the body, and depending upon it, commencing and ending simultaneously with it; not a gratuitously aggressive movement, independent of the body (a fault, which at this

moment characterizes so large a proportion of amateur oarsmen).

When, therefore, a pupil has begun to utilize his swing, if it is seen that he does not back up that swing sufficiently with the use of his legs, he should be told to make full use of the latter, and that use should be fully explained to him —(1) As to its rigidity, and (2) as to its co-extension with the strain on the body. The old and time-honoured formula of lifting one's-self off the seat with simultaneous use of oar and stretcher, is the best and simplest explanation to a beginner. The lift of the body can only be obtained by simultaneous use of the handle of the oar and of the stretcher; neither strain can in such a case be put on one instant before the other, or there would be no lift. At the same time it must be explained that the legs, while thus supporting the body, do so passively—rigidly—not with any extension of the legs (on a fixed seat). The more simultaneous the rigidity of the legs to the strain on the body, the greater the power of the stroke.

A faulty use of legs consists of—(1) Not sufficient pressure of the feet, or (2) if pressure, not contemporaneous with swing; (3) if pressure and contemporaneous, still not with rigid joints. But though the legs are thus rigid in their action, *i.e.*, do their best to keep rigid, the knees "play" up and down a little, and their increase or diminution of flexion to a small extent, and in a certain manner, is no sign of an improper or unrigid use of the legs. It is simply due to the reason that every man, even on a fixed seat in the boat, rows more or less on an (internal) sliding seat; that the bones of the thigh move fore and aft slightly, with each swing of the body, through their covering of flesh, and the motion of the knees is only the result of the instinctive accommodation of the muscles to this slight movement of the

basis of operations, while they maintain meantime the rigid pressure or prop of the feet against the stretcher to support the action of the body.

While thus acquiring the proper action of the legs—at the right instant of time—the pupil's stretcher should be set about an inch longer than would be used by a more experienced oarsman of the same size, on the same principle that his rowlock, as explained previously, should be a trifle higher, so as to avoid all fouling of the knees, till he has acquired some command of recovery and watermanship. When he has attained that, his work and stretcher will be reduced to the ordinary lengths at which a practical oar can make most mechanical use of his physical strength

When one stroke has been rowed out, the next step is to get forward into the position in which to row another. Much of the value of subsequent strokes depends upon the manner in which the recovery after the stroke is effected. It must be borne in mind that the set of muscles weakest in proportion to the task required of them in rowing are those of the abdomen. In rowing a race they are the first to fail. It is harder to carry the body forward with them, with the oar feathered, against air, than to drive the body back with muscles of loins, etc., when the oar is square against the water. The result of such exhaustion is "rowing short," which is owing, not to such weakness of the loins, etc., that the oarsman, if once forward, could not row the stroke through still, but to the failing powers of his abdominal muscles, which become unequal to the task of carrying him forward to repeat the stroke.

Bearing this in mind, it will be seen that before a man can be of use in a race he must not only develop by exercise those muscles of the abdomen which hitherto have never been thus called into play, but must also learn to

economize them, and to use such strength as they possess to the very best advantage. The first thing, therefore, that has to be learnt is to get the hands off the chest, and the arms extended in front of the body as rapidly as possible. Not only does the action give an impetus to the swing of the body, facilitate its motion forward, and open the chest for respiration, but also the position with arms thus extended is that in which a man with such ease pushes away any resisting object in front of him. Let this be shown practically to the pupil. If he wants to push away a man from in front of him with the weight of his body, but his arms intervening and being the means of contact between himself and the other man, he will find that he uses the weight of his body forward to better advantage if he pushes with straight than if with bent arms. This will teach him the importance of doing as much as he can of the work of carrying his oar back for the next stroke with straight arms.

This action of shooting out the hands from the chest and of extending the arms should be rapid for the reasons above shown, but its rapidity should consist of elasticity, and absence of loss of time at the chest, rather than in any hurried rush. The process of reversing the machinery instantaneously, of quickly bringing into play muscles converse to those which have just rowed the oar home to the chest, does not come naturally to any one, and with some beginners it is a matter of extreme difficulty. Yet it should be overcome, else when the oarsman progresses to a crew he will find himself out of swing with the rest, compelled to rush at the last to make up for time lost in the early part of the recovery, throwing himself out of time and swing, and wasting his own strength by "bucketing."

For this reason, as in other instances, recovery of the

hands is first made a separate piece of practice. When the manipulation of the feather is mastered, let the practice of it be extended so as to include the shoot out of the hands from the chest after the hands have dropped and turned the oar. This will in time engender elasticity of recovery of the hands, which should come off the chest like a billiard ball from a cushion, not necessarily with a rush, yet without a hang. However slow the stroke may be, the hands should no sooner have completed their feather than they should have bounded away. The *pace* at which they leave the chest will depend upon the relative speed of stroke, just as a billiard ball leaves the cushion faster as it strikes it harder; but whether it strikes hard or soft it never hangs on its impact, and no more should the hands.

This system of breaking up the coaching of different details into distinct pieces of practice, though not often attempted, will be found to gain in the end far more time than it consumes. A musician who bungles over one passage, practises it separately, without repeating the whole piece, part of which is done already with correctness. And with an oarsman not only can the faulty piece of the stroke, practised separately, be studied far oftener in a limited time than if the whole stroke was appended, but, further, if he has more than one fault, his attention may be competent to devote itself to the cure of only one at a time; and if he meantime repeats the whole stroke, while thus curing one fault only, he repeats the other faults which he has not yet time to attend to, and so hardens himself in them before the time comes when he can spare special attention to them. Analytical coaching in detail such as recommended will soon prove its own advantages if once essayed by a coach.

The body as well as the hands should be kept in perpetual motion, like a pendulum, always swinging. This should be

carefully inculcated. The muscles of the legs, thighs, and loins should all join with those of the abdomen in the recovery, though necessarily the greater strain falls upon the latter. The feet also should draw the body from the strap by which they are held; but if, as explained in a former chapter, the pupil tries to do the entire work of recovery from the feet, without using the loins and legs to aid, the strap should be taken away for a short time, and he should be taught to recover without it; at first simple recovery, swinging to and fro without rowing, and then a few lessons with the oar without a strap, till he has learnt to use the muscular power which he exacts. For the reason that recovery is the weakest point in a man's rowing, too much care cannot be taken to teach him to use all the available resources he possesses in this direction.

A slight hang of either body or hands must entail extra hurry sooner or later in the swing to make up the lost time. All this causes exhaustion. No man rowing a mile race would stop dead every hundred yards, and then spurt to make up his lost ground, yet half the oars on the Thames first hang and then "bucket," or rush forward to get in time for the next stroke. If a man hangs only one-tenth of a second at his chest at forty strokes a minute, he *sits still four seconds per minute.* The main stress should be laid on the elasticity of the hands, for without them the body cannot recover, except at great waste of power. A man who tries to push his oar forward with his body while his hands remain at his chest, infallibly doubles over his oar as he goes forward, his lungs are cramped, as well as his powers needlessly taxed. Also, inasmuch as even on a fixed seat the knees rise and fall a little with the swing, the quicker they are cleared before they reach their full altitude by a quick shoot out of the hands, the less chance is there of fouling them, especially

in rough water, and the shorter need be the stretcher used; thus adding to the physical power. The first part of the recovery should be the most rapid. As the end of the reach is approached, the pace of the swing forward should slacken somewhat in proportion. When the first part of the recovery is slow, and the last part, therefore, of necessity a rush, the result is to dip the stern of the craft, especially of a light one. On the other hand, the longer the weight of the body remains back, after motive power with the oar has come to an end, the more is the "way" of a boat stopped, while, *per contra,* an elastic recovery facilitates it.

The same principle may be seen in a swing. If the body is thrown in the direction in which the rope is travelling, the swing is diminished in extent. It is increased if the body is thrown in the opposite direction to that in which the rope is swinging. Hence, as a matter of pace as well as of physical exertion, elasticity of swing is a gain.

As the stroke is about to be repeated the hands must be raised sharply, just as the body commences to throw itself back; thus no part of the stroke is wasted in the air, which is commonly called "clipping" the stroke. If a pupil shows a disposition to clip, it is best at first to point out for a mark some spot on the back of the man in front of him, at which he should aim his hands, instead of diving them down to the seat before him. But if this remedy fails, a rough and ready one can be resorted to in the shape of a rough piece of deal nailed on the top of his stretcher for a short time. He will keep his hands well up then to save his knuckles from being barked by the contact.

The beginning of the stroke should be the most forcible part, not only because the body is then at its greatest physical advantage, but because a light boat, if touched gently before the greatest force is applied, slips away, and

offers no satisfactory resistance to the principal strain when attempted to be enforced. This "catch" should be a "drive" from the body, set in motion by the action previously alluded to, as if the whole body was to be lifted off the seat by the joint support of oar and stretcher. But it is sometimes a delusion with oars that "striking" the water constitutes a "catch." If so, then the more impetus an oar can first obtain in air by "clipping" before it touches the water, the sharper will be its catch; and this is just the exaggeration into which they fall. But in that case the loss of area swept by the oar in the water, the air being substituted for part of the water, more than detracts from the gain of this force in striking the water for what little reach is left to be rowed. The Cambridge University Eight of 1865 was a memorable example of this delusion. The sudden application of full strength to the oar in the water without waste of motion in air is a question of knack, which cannot be expected to be learnt at once; but he who best acquires this knack will make most use of his stroke, supposing the stroke to be, moreover, well rowed through.

Herein also is another snare into which men often fall who study a "catch," regardless of its first principles. They catch the water, it is true; but, having caught it, they let it go again instead of carrying out the "drive" thus commenced right home to the chest, with a good swing back, the legs pressing rigidly the whole time. In order to inculcate a good grip of the water, a coach should always make his pupils endeavour to make the oar drive faster through the water than it passes through the corresponding distance in air. The recovery, though thoroughly elastic, should, especially towards its latter part, be slow, measured, and massive, compared to the sudden and lightning dash with which the motion should be reversed, and the swing

back commenced with the new stroke. "Slow through the air, but *no hang*, and sharp through the water," should be his maxim, and this relation of speed of stroke to recovery should be rigidly maintained, even where the pace does not exceed twenty-six strokes per minute. The slower the swing forward the less exertion it causes, and that exertion saved on the weakest set of muscles can be expended on the strongest in driving the oar through the water; and though such a "drive" is individually more exhausting than a "draw," it will command so much more pace out of the boat that the same speed can be obtained by a fewer number of "drives" per minute than of "draws," so that the diminution in number of applications of power per minute atones for the extra exertion required to make them—quality more than makes up for quantity.

CHAPTER V.

"FORM," AND ITS VALUE—THE DISTANCE OF THE SWING BACK.

Up to this point no allusion has been made to details of "form," *i.e.*, of the shape and style of the body in rowing a stroke, or in recovering. And so far for these reasons—first that, as said before, these chapters are directed to coaches rather than tyros themselves; and an ordinary club coach, even though sometimes not quite clear as to the best method of getting out of his head, for the benefit of his pupils, what he has in it, is at least supposed to know what "form" consists of—an appearance which is palpable to the greenest *habitué* of the river. And, secondly, the reasons laid down heretofore, if carried out, will result in good form; it is simpler, therefore, to have explained the

causes which will lead to good form, rather than to have harped upon the mere effect (form), which everybody is supposed already to know and to appreciate. To be conscious of an effect, or of its absence, does not necessarily imply acquaintance with the causes that produce it, but knowledge and analysis of these causes cannot but produce experience of the effect when the causes have been practically carried out.

Square shoulders, straight swing, elastic recovery, absence of doubling up at the finish, and of hang, and of bucket—all result as a matter of course if the directions laid down in previous chapters are carefully carried out. And, last of all, if the feet are placed against the stretcher, with toes pointed apart, so as to open the knees, and the strain of the stroke is done from the loins and legs, the back is sure to do its work with as straight an action as is natural to it. We do not say absolutely straight in all instances, but rather the reverse, if anything. Not more than half, if so many, of the best oars of any generation row with perfectly straight backs. Such a back has the most taking appearance; it is the most telling point (to a casual observer) of the "form" of the oarsman, and for this reason undue stress is sometimes laid upon its value. It is of some value, but it is by no means a *sine quâ non.*

The values of a straight back are—1. That the man who so rows must be swinging from his loins only at the hips, and not from any point in the middle of his back as a secondary pivot. 2. That the straightness of the back, to some extent, eases the respiratory organs. But it is not every back that can naturally lie perfectly straight from hips to shoulders when full forward. Much depends upon the conformation of muscles, hips, and loins. Any back can be perfectly straight when the body is sitting upright,

but unless it can remain thus straight when at the full reach forward, and taxed with the full strain of the oar, it is better that it should never essay to lie straighter at any one time during the stroke that it can from first to last. If it does, the result of being straighter one time than at another is that a separate swing is made during the stroke, from that point where the bend takes place, to straighten it. As the legs do not join on at the point of this bend, the straightening must take place without their aid, and consequently without power. The main strain of the stroke must for the instant be relaxed to an amount which the muscles of this part of the back unsupported by legs can bear, so as to allow of this straightening, and thus less work is done by straightening the back completely, in time for the finish, than if the stroke were rowed through with the back bent as much at the end as it was at the beginning. It will suffice if (1) the back is as straight as natural conformation will allow of when the body is at full stretch forward, and (2) if it is kept at the same bend, neither further bent and straightened, up to the finish.

Stress is laid upon this, because so many coaches lay an undue stress upon the necessity of a straight back, confounding its use with its beauty. They bully a man to straighten his back, and he, doing his best to obey, straightens it at least towards the end of the stroke even if he has been physically unable to straighten it at the first, when reaching forward; or he sacrifices work and reach to preserve a straight back, by not reaching out further, or straining his back more than he can do with due regard to its straightness, the result being a loss of power throughout the stroke. And, inasmuch as the value of a straight back is use rather than ornament, let the coach, while inculcating the merits of a straight back, and placing his pupils at their work, so that a

straight back (if natural to them) shall result, be then content to watch whether the work is done from the loins, and not from a bend in the middle of the back, and also whether the back maintains the same normal position throughout the stroke as that with which it commenced it.

An artificially straight back is one of the delusions of the day. Let it be natural or be absent. One thing is clear, if a back is straight from first to last, the work *must* have been done from the loins; if it is bent, it *may* have been so done, but in that case the back will have to be watched to see that it neither gives nor takes while doing its work. If it does neither give nor take, what is wanted is acquired. The main desideratum after all is work, to be done at the right time and in the right place, and if the round-backed man does this better than the straight-backed, he is the better man in a boat. Of good oars, as said before, if half of them row with straight backs, it is as much as they do. Of the rest, the larger proportion row with a back slightly rounded, but in the same arc throughout the rowing, and a few actually row with backs as round as hogs', and yet are good oars in a boat. With these it is true that some of them might, if carefully coached from the outset, before their rowing muscles had developed to a shape corresponding with the action they had adopted, have finally rowed with straight or straighter backs, and to have been even better men than they are, but whether a round back is the eventual result of fault, or of the original proclivities of physical conformation when reaching forward, it should not be allowed to prejudice the eyes of a coach in his selection of a crew, if the work desired accompanies the round back. Of two choices, equal in work and in the way in which it is done, one round and the other straight in the back, the latter is in such a case to be preferred, as being an easier model from

which the men rowing behind him can take up time and swing. But this is all.

The distance to which the body should swing back at the end of a stroke is a very open question, and one which has always raised much controversy among coaches. And for this reason, that in laying down a rule for it they have been prone to define a normal distance or angle to which all bodies alike should swing back, instead of bearing in mind that the exact regulation of the distance should depend upon the make and shape and powers of recovery of the pupil. Again, the manner in which a swing back is effected is often deceptive as to the distance swung. A straight back often appears to swing back further than a round one, because the head and shoulders, instead of being more or less slouched forward at the finish, are erect, and in a direct line from the small of the back, so that a perpendicular let fall from them would fall further forward in the boat than one let fall from a slouching head. But possibly in the latter case the lower part of the back has swung further back than in the former. It is only the forward slouch of the shoulders that makes the distance appear less. That man does his work (*quâ* swing) to best advantage whose body, when straight at the end of the stroke, makes an angle of twenty-two and a half degrees (one-fourth of a right angle), or even a trifle more, with the perpendicular, the reach forward having been full length.

At the same time two things have to be considered:—1. Whether the man is physically capable of maintaining this length of swing back without sacrificing some of his reach forward. 2. Whether his powers of recovery are adequate to the distance through which his body has to be recovered for the next stroke. If both questions can be answered in the affirmative (not only for a short row, but for permanent work

and racing) he is a good man. But because he is thus capable, it does not follow that every man has similar powers. It will suffice if the coach teaches his men at the outset to swing back a trifle beyond the perpendicular, and lets his further instructions in this respect depend upon the powers of swing and recovery which he observes in the individual as education progresses. An honest oar, doing all the work he can, will soon swing back all he can to get the most in his power out of the stroke set to him. The coach must watch carefully that a would-be hard worker does not delude himself by substituting extra swing back for reach forward.

This view of a long swing back may find disfavour with many authorities, for it is always held and allowed that the first part of the stroke is the important part, and the latter is often supposed to be but a mere adjunct. But it must be borne in mind that though the body has most physical power at the commencement of the stroke, it endures most exhaustion, as previously explained, in the recovery. If recovery were an inexhaustible power, the most rapid style of rowing would be *n* strokes per minute short, the seat far from the work (or rowlock), and the oar catching the water only just behind the rowlock, leaving it almost as soon as it had passed it. That is why a short, quick "snatch" can often take a lead at first in a race. But the demands of recovery alter the whole position of affairs. It is found more economical to recovery to swing well back, and to row a fewer number of long strokes in one posture than a larger amount of short ones in the posture just described. And though in the long stroke, with work as generally laid out, neither body nor oar exercise, during the *average* of the stroke, such power, physical and mechanical, as they would in the other way, the difference in exhaustion between many

quick recoveries and freer and slower ditto more than compensate before any great distance has been traversed. For this reason an extra swing back (though the work done is not at such physical and mechanical advantage at the finish as if a new stroke had meantime been commenced) gains by lengthening the stroke, and so by reducing the pace of stroke and speed of recovery, more than it loses.

A second consideration is, that the greatest physical power takes place at one time in the stroke, and the greatest mechanical in another. The greatest mechanical power is when the oar is at right angles to the rowlock. "Work" is not placed at the same distance in all boats, but in all, more or less, the arms have begun to bend in order to row the stroke into the chest almost as soon as the oar has passed the right angle to the rowlock. Though the body should continue to swing back till the arms overtake it and the oar reaches the chest, yet from the instant that the elbow-joint begins to bend the stroke greatly decreases in physical power. Yet this diminution of physical power takes place at a time when the mechanical power of the oar is greater than it was at the commencement of the stroke. The further the body swings back, the later is it necessary for the arms to commence their bend, and consequently a greater amount of that work at which the mechanical power of the oar is greater is done with still rigid arms, and with use of the body and loins.

This last point is too much overlooked, and many oarsmen of practical experience have often been heard to say that though there is no denying that the body is weaker at the end than at the beginning of the stroke, there is also no denying that a long swing back materially adds to the pace of a boat. Still more is this exemplified in sculling, of which more later on. The explanation is that above given,

that the arms are thereby enabled to be kept straight for a longer period, and at a critical time in the mechanical work of the stroke.

In teaching a man to swing back he should be told to hold his head well up. The weight, if thrown back, assists his swing, while if hanging forward it acts in a contrary direction. A very common fault of beginners is to be constantly looking at their chests, as if to see that they are well opened at the finish. It is like a man looking round in a glass to see if his coat fits him behind. Even if it did fit him before, the shape is disordered the moment he turns his head and neck to reconnoitre himself. He does best to allow some other person to inform him of the fit while he holds himself straight; and so with an oarsman—if he wants to make sure that his chest is open, let him hold up his head and trust to being told, at least, if it is not then open.

While on the subject of not holding the head up, a word of caution to strokes of racing crews may not be out of place. The habit of keeping a watch on the stretcher to time the pace of stroke (thus to form an estimate of what amount of exertion represents a certain pace of stroke, for guidance when racing), often tends to make them carry their heads forward as a matter of habit. If this fault is noticed in a seasoned oar, it may be assumed, in the majority of cases, as a safe guess that he learnt the trick some time or another from looking constantly at a watch on his stretcher. But inasmuch as a prone head hampers swing and cramps finish, and a stroke's style is more or less transmitted to the crew behind him, a warning on this subject will not be out of place. There is no need to carry the head constantly forward in order to count: a casual glance at a watch on the stretcher will give all the information required.

CHAPTER VI.

CHOOSING AND PLACING A "JUNIOR CREW."

WHEN tyros have reached a certain state of progress, they may be expected to aspire to a seat in a race of some description. After all, the pains expended upon them have not been, as far as the coach has been concerned, simply to give them a practical knowledge for paddling up and down a river on pleasure excursions; the ulterior aim has been to make them of essential use in a racing craft. It is with the selection and management of a crew for a race that the most arduous responsibilities of a coach commence. He has to judge not only present facts but future contingencies, and to base his decisions upon a combination of the two.

Especially does this doctrine bear upon the selection of crews for University and college races. London crews are, as a rule for important races, composed of such seasoned oars, already thoroughly *au fait* at watermanship, that in nine cases out of ten the eight men who would be best on the future day of the race would also be the best on the day of selection at the commencement of training, except so far as "condition" is concerned. But in the Universities, oars come and go so rapidly, merit is hardly attained before residence ends, and the vacant ranks have to be filled with recruits. These recruits are often but in a half-developed stage of oarsmanship when they join a crew, and hence, in selecting such a crew, a coach has to judge, not only who are the best men at the moment, in itself not always an easy choice, but further, who seem likely to make the best men by the day of the race, allowing for the time still before them.

In the case of a raw crew, the choice of a seven is, anomalously, even more important than that of a stroke: *i.e.*, if there is only one seasoned and steady oar in the lot, he will do more good at seven than at stroke. Behind a stroke inferior to himself he will be able at least to form a nucleus of steadiness, to which the rest of the crew may rally; but if the places of these two were transposed, the style of the more finished oar at stroke would be wasting its sweetness if the seven behind him rowed like a pair of scissors with him.

In forming a raw crew, such as an Oxford "torpid," with some weeks still to intervene before racing commences, the coach need not be careful from the outset to place his men in the seats which, according to their size, they would occupy if the race were imminent. He should place them where they will best learn their duties for the seats they are eventually destined to fill. "Trim," that may be important later on, when racing commences, is at the outset less important than time and swing. If, therefore, the future five or four has less idea of swing than three or two. they should respectively change places till within a fortnight of the race, by which time the heavy weights will be, from having had greater advantages of studying time and swing, all the fitter to fill their eventual seats, and those who would otherwise have been rowing behind them will not meantime have been thrown out by irregular swing before it has been corrected.

Stress is laid on this matter because too commonly a crew is made up in its future places from the moment that practice commences. Even supposing that the eight men thus commencing practice will be the same for the race, this policy is shown to be questionable. Inasmuch as there are more middle-weight oars than heavy-weight, it stands to

reason that, at least till the heavies have been thoroughly polished, the middle weights will produce from their larger numbers more men capable of good time and swing than the heavies. This is constantly visible in raw crews. The lighter weights are rowing in fair form, the heavier are "all over the place:" yet the latter are always placed in the heavy-weight seats long before they are wanted to race in them. Were they transposed, as suggested, both heavies and lights would improve more rapidly.

If both a coach and a stroke of similar calibre can be found, the task of the seven will be much simplified. He will have not only a model, but a man to back up that model, and to transmit his style to the rest of the crew. In default, the coach must often take stroke's place (or get some proficient who can) for a short time. This is chiefly for the benefit of the stroke *in futuro*, and he, therefore, should be sometimes in these cases shifted to seven, that he may get an idea of the desired style from rowing behind it, and sometimes turn out on the bank, that he may study his model in profile.

In handling a very raw crew, such as described, the coach will be continually surprised to note the disproportion of improvement in various members of his crew, and will often find that a man, who was perhaps his last choice in the boat at starting, soon earns a seat of importance towards the stern, while another, whom at one time he looked upon as his mainstay, may remain *in statu quo* of merit throughout practice.

Inasmuch as there is always a larger field of middle weights for choice than of heavy weights, yet the latter ones, once got into shape, are the more valuable, a coach should not be afraid, early in practice, to put into his crew some welter, of whose chance of ultimately reaching the required

standard before the race he is most sceptical. He may give him a chance, and see if he shows signs of improvement. If not he can fall back in time upon some middle weight in reserve. Such conduct is a mere matter of speculation; it may fail in one case, and the welter prove useless, and in that case, of course, the middle weight who takes his place has lost a certain amount of coaching; but if, on the other hand, the trial succeeds, more will be gained than could ever have been lost. A coach does not necessarily deserve censure because such a speculation has failed on a given occasion. All must depend upon an average of success; and, as a rule, he who is boldest, most self-reliant, and *tenax propositi*, so long as hope lasts, but who in turn does not hesitate to confess to himself an error of his own judgment in time for remedy, will show the highest average.

In "weighting" a crew, it is a fallacy to lay much stress upon evenness of weighting the two "sides" of a boat; men sit so much over the keel in racing-boats, that two stone or more on one side more than another does no harm; besides, if there really is an unevenness on the keel, it can be remedied at once, by shifting one heavy weight one inch more or less into the middle of the boat. This will hardly be felt by him in rowing; but the effect will at once be evidenced in the balance of the boat. The real thing to look for is evenness of work. If one side row the other round, pace is lost and strength wasted.

Though in early practice men need not, as said above, be tied to the places they are eventually to occupy, yet, of course, in choosing a crew, a coach must look out for certain requirements for certain places. Not everybody can row bow, though there may be a dozen welters capable of doing more work than the bow eventually selected.

It is a good thing also, in early practice, to change the

men over from side to side. If a man exhibits glaring faults, it is the very best thing that can be done with him; and even where no particular fault is seen that can be attributed to undue use of one arm or leg more than another, it improves a man's watermanship at once, and to a great extent debars him from faults, to shift him from side to side. To a man who does what work he performs evenly with both legs, loins, and arms, the change of side will be immaterial. Except so far as the "feel" of his oar at starting (as no two oars feel just the same), and the action of the feather (the main strain of which falls on the inside hand, though both should hold), he will be as much at home on one side as the other, and after a minute or two of work on the new side, to "get warm to it," he will be perfectly easy. The moment a man begins to prefer one side to another (unless he has some conformity which accounts for it, *e.g.*, an arm once broken), it may be answered that on the side which he prefers he is not using his body evenly; for if he did, *ex officio*, there would be no difference in action. Thereupon the mere fact of his dislike of one side is the very reason for putting him upon it. He shows that he neglects some muscles of one side of his body when on the side he likes, and the change of sides will bring the neglected muscles into play, and improve him for both sides; and especially in raw crews, even if a man has no original tendency to use one limb more or otherwise than its fellow, the rolling of a boat, and his self-accommodation to the discomfort, may engender faults and one-sided action before he himself knows the cause. Change of sides will obviate this—at least it will prevent a habit being formed for one-sided action with either side.

A stroke to a great extent *nascitur, non fit.* We do not mean to say that a stroke does not require tuition, far from

it; but, on the other hand, that all the tuition in the world will never make even many a first-class oar into a first-class stroke, if the nature is not in him. Such a man may make a good ordinary stroke compared to duffers. Yet with all his excellence, it may be found that some oar, far inferior to him in power and form, has yet the knack of getting much more out of a crew than the first-class oarsman. Many a man can row well enough till he comes to row to his own stroke, and then he deteriorates. If put behind a man inferior to him in style and form, he again rows as well as ever. Such a man can, at seven, make a bad stroke almost into a good one, by setting a good swing; yet if he attempted to row stroke himself, his excellence would vanish, even supposing that he had a man to back him up.

One of the hardest things that a coach has to do, is to judge the amount of work that a man does—first, positively; secondly, which is still more difficult, his relative amount of work in proportion to his weight. The eye must guide the coach to a great extent; he must watch the water aft of the oar, as it is rowed through. Supposing the blade to be covered fully, then, if an oar is well driven through from first to last, bubbles will be seen at the back of the blade, especially during the early part of the stroke. The faster the oar is drawn through, the stronger the swirl of water behind it, filling up the vacuum it leaves as it passes; and in this swirl there will be bubbles, which are less able to rise to the surface in proportion as the swirl is strong. The bubbles, many or few, are a measure of the strength of the swirl, and the swirl of the pressure of the oar. The bubbles are from the air carried in by the oar in its first dip. If the oar is moved but gently through the water the swirl is not strong enough to prevent this air from instantly rising to the surface, instead of being carried along with the blade,

Another test of work, but one which must be taken *cum grano*, is that of "feeling" a man in a pair-oar gig. In so gauging a man the coach must note carefully whether the circumstances of the trial are satisfactory. It is no test of one oar necessarily rowing harder than another that it pulls it round. One pound applied at the end of the stroke pulls a boat more round than three at the beginning; and if one oar gets into the water a trifle before the other it at once swings the boat sideways, and the impetus remains, and is not fully counterbalanced, even if the oar last in comes equivalently later out. Or an oar can row another round by actually shirking the middle of the stroke, letting his oar move slowly till the honest oar has finished, and then winding up with a tug, when there is no opposite oar to balance the tug. All these things a coach must bear in mind. But if his men in a pair-oar begin and end the stroke together, and both row equivalently, *i.e.*, equally in proportion at the begining and end of the stroke, the course of the boat will *then* be a test of the work done by each. Bow has a certain amount of leverage over stroke, how much depends upon the length of keel and build of the boat, whether "camber," etc. All this a coach must gauge. Still, like the test of "timing," so often abused as unreliable, the test of "rowing round" holds good, if all circumstances attending are duly weighed and equalized.

If there is one phrase more misused or misapplied than another it is that of "rowing one's weight." If nineteen out of twenty of those who use it when they criticize an oar were asked what they meant by it they would not know. It is the most hackneyed phrase in the mouths of know-nothings who wish to pull a man to pieces, and its frequency of use seems to depend upon its obscurity. It can mean anything or nothing. It cannot mean that a man should put a strain

on to his oar equal to his own weight avoirdupois. The yielding of the boat and oar in the water would prevent this, and if the boat were ashore, and the oar pressed against a solid substance, the oar would break before any such pressure were obtained. Let any man not a feather weight lay his oar over a bar, fasten the blade firmly to a fulcrum, and sit on the handle, and he will have to pay for a new oar. So this is not the meaning. Is it then the "weight of a man in the boat?" If a man sits alone in a boat and paddles with his hands he moves the boat, and so must be "rowing his weight in the water," and that of the boat as well. The nearest approach to a solution would be to say, that if a man does so little work that the boat would go faster if his place were vacant, he does not row his weight; and a man must be very bad indeed for this to be the case. If he can keep even time and swing he will still be better than nothing, and will make the boat go faster with him than with seven oars. But it does not follow that he does his share of the work. Others may do more than he does in proportion to their weight. This may be seized at as a solution by those who use the expression; but even this will not do. A crew cannot all row proportionately hard for their weight. One man must row hardest in proportion. Then the seven other men do not "row their weight" compared to him, or, if an average is struck through the boat, of work for weight, some will be over, some under it. Those under it do not row their weight in proportion to the rest, yet the same men in a worse crew would be found rowing more than their weight.

So that it seems that the expression is a misnomer, as a positive term, and is applicable only as a comparison of the work of one man with that of another, weight being also compared. Finally, granting that a man may be thus below the average of the crew, unless some one can be found who

will raise the average he must stay where he is. Somebody must always be at the tail end of the average unless all are equal. It is in comparing a man's work for his weight with that of another that the greatest difficulty often arises. It must be borne in mind in choosing a crew that apart from sheer work, absence of faults must weigh to some extent. It is no use for a man to work hard on his own hook if his faults hinder other men from doing their best. But this will be treated of more fully in analysis of faults and other remedies in a later chapter.

CHAPTER VII.

ANALYSIS OF FAULTS—FAULTY FINISH—WRONG GRASP—OVERREACH—MEETING OAR—ROWING DEEP.

WHEN a crew has been picked and set into regular practice, the task of the crew will be, of course, to correct individual faults, and to inculcate uniformity. Though the latter is the most important element of eight or four-oared rowing by the time the race is due, so much so, that every-day experience exhibits weak but uniform crews defeating others physically and individually superior to them, but which have not acquired uniform time and swing, yet too often in early practice a coach allows his main energies to be expended too much in objurgations against bad time and swing. "Time" is called and admonished every half-minute to the exclusion of correction of the very faults of form which probably are at the root of the inequality of time. In the first row or two behind a strange stroke a man may be inaccurate in time without, perhaps, being radically wrong in form; but so soon as he has got used to the stroke he knows an absence of time must be ascribed to some other radical

fault, and it would be much more to the point if the coach would devote his energies to tracing out and correcting this, instead of simply repeating the information that No. — is too soon or too late in the water. If the individual rowing of a crew is well looked after, if the swing is elastic, hands at the right level, and so on, the men will tumble together before long. To see a crew out of all time three weeks before a race is not by any means such a bad sign as to see a generally bad point in style—a slack grip of the water or sluggish recovery. Such faults as the latter are unlikely to be cured in the brief space remaining; but time may be suddenly acquired in a few days at the least by a crew that has been rowing like a peal of bells. A long day's row shakes men together, and gets them instinctively to settle to swing, and with it to time. At the same time, long rows, without stoppage, should not be attempted too often early in training. The usual distance rowed without an easy should be not more than half a mile at first, expanding to about a mile when wind has become a little clearer; but the row should not be so long as to last beyond the period when the men get blown. If it does, they will only contract new faults in their exhaustion, instead of losing those which they have. A long day's row occasionally, with frequent easies, serves to settle the men to their places, and yet gives them time to recover their wind after each stage. When the stroke begins to quicken, a fortnight or so before the race, it will be time enough to "blow" the crew, and accustom them to distress; but this part will be more fully entered into when treating of training.

It is a good plan to teach men in any crew to let the ear guide the finish of the stroke, just as the eye the beginning. A definite and simultaneous rattle in the rowlocks as the oars all feather sharply together, marks the finish

distinctly, and enables the men to bring the stroke to a close simultaneously. When this is done the boat is steadier, and the oars having all finished together, start fair for simultaneous recovery, and so for a simultaneous catch of the water at the next stroke.

In the last chapter, stress was laid on the importance of choice of a seven. With too many trainers too much importance is attached to the trim of a boat. That of one side against another is, as before explained, of next to no importance, that of their fore and aft is of more importance, but not of so much as time and swing. Yet the latter are continually sacrificed to trim. The man whose style is best adapted for stroke or seven is often placed in the middle of a boat, because he is said to be "too heavy" for the ends of it. Weight aft is a bugbear to most coaches; yet it really makes far less difference than they suppose. Many a college crew and more than one University eight have been marred by the red-tape theory of placing the men according to their weight in the boat. Extra steadiness or generalship in an oarsman is worth all the trim in the world. Especially in a college boat it is best policy to place the steadiest man seven, regardless of his weight, even if he be thirteen stone. The crew that does so will gain more speed by extra uniformity than they will lose by the misplacement of a short inch of "trim" at the stern. In a University eight there is a larger field to choose from, and a steady seven of the required scale of weight ought to be forthcoming. But if he is not, the same principle should be adhered to—of time before trim. Those college crews which have at the beginning of training been most criticized for an *outrê* disposition of weight—for the sake of a steady style aft—have seldom failed before the end of racing to prove the soundness of their tactics.

But while thus extolling the value of time and swing in a crew, we do not urge continual preaching of the thing in the abstract to the men. A coach cannot say everything, and too much scolding about time detracts from his leisure for attending to other faults, as said above, which in all probability lie at the root of the bad time. Such faults may be particularized, and plans suggested for curing them.

By far the greatest number of faults in rowing are perpetrated during the latter part of the stroke, the finish, or the recovery. Of faults in the middle or beginning of the stroke, most of them arise as a natural sequence to some other fault already existing in the finish or early recovery, so that the cure of the latter works that of the former.

As a sample of how one fault, such as above alluded to, breeds others dependent upon it, let us take that of *finishing the stroke with the biceps* instead of the muscles behind the shoulders. Who ever saw a man who so finished, who did not also hollow his chest more or less, fail to set thoroughly well up at the finish, and, finally, be irregular in his swing, too slow at first off the chest, with a bucket at the last to make up for lost ground (unless he saved the necessity for bucketing by only reaching out so far as he could without an extra rush at the end of the recovery, in which case rowing short is substituted for bucket)? The connection of all these faults can be traced. By finishing with the biceps the arm is bent more acutely at the elbow than in the orthodox finish. Then, if the elbows are kept close to the sides, the bend of the arm brings the hands too high at the finish, thus the oar goes too deep—another fault in this variation. If the hands are maintained at the right level, the oar is saved from going deep. This can only be

secured by dog's-earing the elbows, for they must go somewhere (the finish with the biceps bends the arm too acutely to admit of both hands and elbows being in correct position, —one or other must give place, *i.e.*, take up a wrong position (fig. 5). In either case, whether the hands are too high or the elbows too square at the finish, a bad recovery of the hands from the chest results; in the former version from the labour of bringing out a deeply buried oar, in the latter version from the position of the arms at the commencement of the recovery, for a man with his elbows at right angles to his ribs has not half so much power to push his oar away from him as one whose elbows are alongside of his body. The next stage is that the body, instead of being briskly led in its swing forward by the shoot of the hands, has to lead them, and the result of a lurch of the body against the oar, before the hands are well out, is a slouch and hollowing of the chest. All this wastes time in the recovery, and the lost time has to be made up by a bucket at the end of the swing, or a compromise in the way of a short reach, or getting late into the water.

Fig. 5.—Finish with biceps (wrong).

Now, as to such a man, if the coach, instead of analyzing the matter, or tracing all this sequence of faults to one origin, preaches against each fault distinctly, he has to enumerate so many errors that the pupil is likely to be bewildered, and the odds are against his devoting his serious attention to curing the mainspring fault, especially if he has from these causes got late in the water, and manages, by dint of extra bucket, to cure that much; then, if he some

day learns to finish with his right muscles, he suddenly finds his recovery so much facilitated that he, using the same exertions as before to get forward, becomes too soon in the water. But if the ruling fault had been taken separately in hand, its concomitants would probably disappear with but little trouble when the cause that provided them was gone (fig. 6). The coach should take such a man in hand out of the boat, give him a stick to hold, dumbbells to work, as his manner requires, till the dormant muscles are brought into play, and the use of them thus first stimulated should then be practically applied in a gig pair, first with simply rowing a few "finishes" with the right muscles, and then proceeding to the whole stroke. A man so taken in hand could get into the right path in a couple of days, or even less; but, if simply scolded for each fault separately, while rowing in his crew, he may not improve five per cent. in the whole month.

Fig. 6.—Finish with shoulders (right).

Again, as said in earlier chapters, a faulty hold of the oar is at the root of scores of faults—a too full grasp with the whole fist will be deadening the play of the wrist, causing the oar to sink deep, cramping the finish, and so hampering recovery, swing, time, etc. Thus of two pupils both may be rowing deep, both hanging at the chest, both late in swing forward, and bucketing, yet each from a different primary cause. To tell each severally to correct faults similar in effect, but different in cause, without teaching and explaining the cause, cannot produce much good result. It is for a coach, having once "spotted" a fault, to set himself

at once to trace its cause before he can, with any hope of real success, combat the evil.

A loosening of the outside hand of the oar, always a fault, may be sometimes cause, sometimes effect. It may come from dog's-earing elbows, for an arm in this position is very prone to shirk its work at the finish from the inconvenience of its posture; or, *vice versâ*, the dog's-earing of the outside elbow only, the inside one being finished properly, will be the result of a loosened hand in most cases. The hand being loose, the work of the hand instinctively slackens with absence of work, the impulse to go on with the motion of the shoulder muscles at once vanishes, the hand has to get out of the way, and to follow the oar home, and this it does with the more natural motion of a bend at the elbow-joint—the joint in such a case must stick out—if the oar is rowed home at the proper depth by the remaining inside hand, or else one hand would be at a much higher level than the other, and both could not be touching the oar. But whichever fault first causes the other the result is again a sluggish recovery, and the usual inference, for one hand cannot do the work of two.

A man who does thus is best cured by a change of sides and coaching separately in a pair-oar gig on the changed side. This compels him to use his idle hand when it finds itself on the inside. If the man has rowed on both sides with the same fault he can be made to use his outside hand by telling him to take the inside hand clear off the oar as he rows into his chest. The idle hand is thus compelled to work. A fault of this sort often becomes so mechanical that a man can hardly break himself of it at first without some such means as this, however burlesque they may seem. "Capping" the oar with outside hand is a variation, or rather exaggeration, of the same fault, and should be similarly treated.

Overreaching with the shoulders comes from an anxiety to row long, or to appear to row long, but it causes waste of power, for the shoulders, if not braced by the muscles behind the shoulder-blade, give still more under the strain of the stroke, so that the body is not "taut," and thus is pulling upon a spring. The farther back the shoulders are held, the more is the collar-bone arched forward, and thus

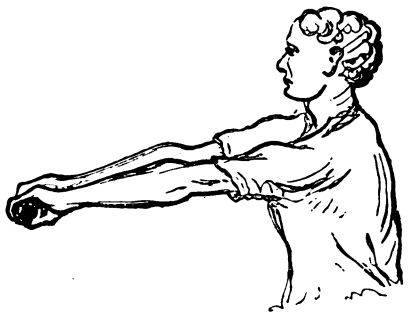

Fig. 7.—Overreach (wrong).

it adds to the support of the shoulders, forming an arch against which the sockets press. If the shoulders are slackened forward, the arch of the collar-bone flattens and becomes almost a straight line; and the more it does so the less support does it give to the shoulders. Thus, the more they stretch in the reach, the more they give when the strain falls upon them. The sequence of overreaching is a slack finish and feeble recovery, for the shoulders (if the stroke is to be eventually finished orthodoxly) have all the farther to work back into their proper position before the oar can be rowed home. If they are not eventually braced up by the finish, the biceps must do the work to the finish, of which we have already treated. Overreaching is best cured by practical illustrations of the required attitude

out of the boat, and then a gentle paddle in a pair; the less work done in the paddle the better will this required action be obtained.

Meeting the oar and rowing deep at the finish (without necessarily a slant of the oar caused by a faulty hold, but a slower dive of the oar, at its proper angle) usually arise from the same fault. Often they co-exist—both engendered

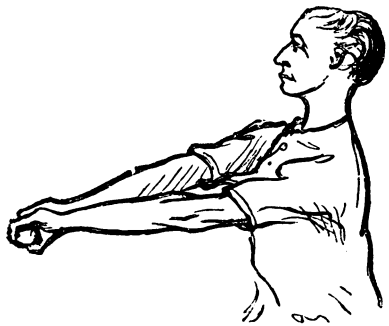

Fig. 8.—Shoulders braced (right).

simultaneously—the one still further increasing the other. The cause in each case is, rowing the finish of the stroke with the arms only; the body having ceased, or nearly ceased, to work. The legs work instinctively on behalf of the body, and the body depends on the legs. If the legs leave off pressing the stretcher before the hands get home, the body stops work, and is dragged forward again by the finish. Or, again, if the body ceases to swing back, and leaves the arms to finish alone, the legs generally slacken their pressure simultaneously by instinct, and the result is that the body is pulling forward by the work of the arms. Another result is that the arms, heavily taxed to row the oar home by themselves, found the oar go easier edgeways

than square in the water. They either bring it out too soon, finishing in the air, or they first rise above the proper level, and sink the oar, and then lower again, and bring it back to its level and out of the water. This up-and-down journey keeps time while the other men are rowing the stroke home in the ordinary way, and is less exertion to the arms than rowing the oar out square by their own unaided efforts; oarsmen delude themselves that they have done what was required to finish the strokes, though really the last part of the journey of the blade has been in the almost useless shape of the letter V, instead of that of a straight horizontal line.

The remedy for both these faults, arising from one cause, is to tell the learner to keep his feet pressing up to the end of the stroke. This will make his body work; his body, working back, will not double forward; and the arms, aided in their efforts, will, with a little care, return to their proper line of action—keeping the hands throughout in the same plane; the rowing deep will thus be cured. Thus it is seen, *inter alia*, that the same result, that of rowing deep, may be produced by various causes, faulty grasp (too full and too tight), use of biceps, or want of aid by legs when finishing. "Bucketing" has also been shown to be connected, as an effect, with more than one distinct and separate fault. This will show how necessary it is for a coach to be sure what is the actual vital cause of a visible effect, and to coach the former rather than to upbraid the latter in general terms.

CHAPTER VIII.

ANALYSIS OF FAULTS (*continued*) — SCREWING — FEATHER. UNDER WATER—UNEVEN SWING—BAD TIME.

NOTHING is more common in raw crews, especially in those rowing in light boats, than an exhibition of "*screwing.*" In some cases this can be traced to a fault of the performer himself; in more cases it is due to some fault on the part of others in the boat, and oftenest of all it is due to the way in which the work is laid out for the men. Without wishing coaches to be prone to listen to the excuses of bad workmen who grumble at their tools, we would urge upon them the necessity in such cases of first making sure that the fault exists in the men, and not in the boat, before they commence to scold about it. We do not mean mere swinging across the boat, for, though that is a fault, a man who does so may yet commence his recovery and end his swing in the proper position; but to the full and flagrant offence known as "screwing," in which the body at the finish of the stroke is out of the line of the keel of the boat, either overhanging the water, or twisted back into the centre of the boat. Now, as a man is supposed to be built evenly at the outset, it is hard to see why he should work in a one-sided manner to his own discomfort; unless there is some external agency beyond his own direct control (so far as the swing goes) which thus perverts him. We say advisedly, beyond his control, *quâ* swing, for the fault which causes the screw may be his own, though unconnected with his swing—*e.g.*, a feather under water, drawing his rowlock down below its right level, and so forcing him to lie away from his oar to clear his knees, etc.

If it is really apparent that this screw comes from an endeavour on the part of an oarsman to do his work with one arm or one leg in preference to the other, the fault must then be confessed to be directly attributable to his faulty and one-sided swing; but in ninety-nine cases out of a hundred the case is just the reverse; it is that the discomfort of the man's seat is such that he cannot, in an upright attitude, utilize both sides of his frame, and he accordingly seeks an attitude in which he can, according to existing circumstances, use his body more fully. The cause in such a case will probably be a wrong level of the rowlock compared to the seat. That level may be wrong in the boat itself, or it may be made wrong during the stroke by the inequality in the trim of the sides of the boat, owing to some fault in the rowing, most probably a feather under water.

But though the level of the rowlock is the commonest cause, others may exist. The one, a cramped stretcher, or rather a cramped posture for the feet against the stretcher; the feet may be badly placed by the builder; either both on one side of the keel, so much to the outside that the body cannot be seated opposite to them, and so the result is a swing into the boat at the finish; or the feet may be placed one on each side of the keel, the inside feet being thus too much inside of the body, and thus tending to make it swing out of the boat. In either case the fault is that of the builder in not giving room for the feet to be placed opposite the body. The other cause is a very rare one, but we have seen it. It is from an uneven seat badly built in the boat, one side higher than another. Though such an occurrence is most rare, a coach should test the possibility of such a cause before he is satisfied as to the nature of the fault. If the boat is systematically "down" on one side,

even that does not conclusively prove that the fault originally lies in the rowing only which has made the boat thus off its keel; it affords strong grounds for presumption, but that is all. A rowlock below its right level will cause its man great difficulty in getting out his oar, and probably tend to make him drag the boat still more down upon his oar in his efforts to get it out at the finish

The only way in which the coach can be certain whether to find fault in the man or boat is not only to measure the work carefully, but also to get into the boat and to try the place himself. A sprung oar, or one that is not square-loomed, or a thowl-pin raking the wrong way, or the sill of a rowlock sinking from stopper to thowl, may one or each be at the root of the evil, apart from the possible misadjustment of seat or stretcher already alluded to. If the coach succeeds in tracing the evil to the boat, his task will be comparatively easy; so soon as the discomfort is removed, the pupil will in most cases at once return to a true swing; if by any chance he has gone on so long with this wrong adjustment of work as to have contracted one-sided habits therefrom, a little gig coaching ought soon to set him straight.

We have laid so much stress upon the necessity for a coach to examine the work before he forms his opinion, because, what with carelessness of boat-builders, even in new craft, and the slovenly way in which old boats and "hack" craft are often turned out, this will be found, as a rule, the most common cause of evil. Only two or three years ago, one of the neatest University oars of the present day was screwing helplessly in practice in the University eight. His coaches scolded, but to no avail. They did not take the advice of some and eject him, for he had proved himself a good man for work in previous races; but

they contented themselves with objurgations, till a bystander pointed out that the man's rowlock was visibly lower than the rest. The idea once started, the rowlock was examined, found to be more than an inch out, was rectified, and in half a dozen strokes the quondam offender rowed as well as ever—the best style in the boat. But if the fault is not in the boat it must be in the men. And as there are eight men in the boat, it by no means follows that the man who suffers most from the boat being "down" on one side is the man who causes the mischief. Work is usually (and wrongly) laid out the same for all in an eight, so that those who sit tallest are the first to feel the effects of the boat being down on their oars, while, *vice versâ* those who sit the shortest are the first to feel helpless if the boat is down on the side away from their oars. The coach must in such a case watch to see who is to blame for the lurch in the boat, and correct accordingly. As to the way to correct the fault which causes the lurch, whether feather under water or otherwise, that will be treated of when the fault itself comes under review.

The fault of *feathering under water* is one of the commonest, and to it may be traced a large proportion of other faults. Yet in itself it need not always be a primary fault. Apart from the chances of a bad oar and rowlock (the old story again), it may come from a faulty hold of the oar. If so, the remedy for that has already been treated of, and the proper way to hold an oar has been explained. But the fault is as often original as secondary; it may come from want of practice in the finish, slurring the two motions of drop and turn of the hands into one motion, so that they either come simultaneously, instead of the drop preceding, or, worse still, the turn may actually precede the drop. The motions in a general feather should be so rapid that the eye

cannot detect what is wrong by simply watching the hands of the oarsman; but, as explained when treating of the way to learn a feather in earlier chapters, the way to detect what the hands are doing is to watch what the oar is doing. The latter tells its own tale. The remedy must be the same as the primary action of a feather; but in that case it often takes longer to *un*teach a bad habit contracted than merely to teach from the very beginning. Still, the coach should never rest till he has cured the fault, for it may lie at the root of others, not only in the one offender, but also in others who suffer discomfort from the irregularity in the boat in which he rows.

Therefore, having well satisfied himself that the fault is not due to bad tools, or faulty hold, which cramps the play of the wrist, he must take it in hand with special drill and practice, in the same way as formerly described for teaching feather *ab initio*. "Loafing" in light boats before the oarsmen are proficient, and especially bad pair-oar rowing, lays the seed of much feathering under water. The boat rolls at first from inequality of time and swing. To remedy this the oarsmen, instead of boldly dropping the hands, and trusting to the bodies to "sit" the boat, keep the oar close to the surface of the water to steady the boat. The drop is lost, the feather reversed, and the actions of drop and turn confused, transposed, etc. The feather under water thus engendered by want of confidence in sitting the boat destroys the steadiness of the craft, spoils the natural level of the rowlocks, and so often breeds a screw out of the boat, as the only way of compromising the difficulty sufficiently to enable both legs and arms to do a share of work. Possibly in such a pair each man may screw to match the other instinctively. Such a sight is too common. Steadiness, therefore, is procured at the expense of a certain amount of

backing water, caused by each feathering under water; and at the further expense of a waste of strength by placing the body other than opposite to both feet, from which the main support to the rest of the body must spring.

Uneven swing forward is sometimes due to a "bucket," which is caused by sluggish early recovery, entailing a necessary rush later on to make up lost ground. This sluggishness in recovery may be secondary, owing to a hang of the hands, due to primary faults of feather under water, rowing deep, finishing with biceps, loosing one hand at the finish, or other faults which have already been treated of. If, however, none of these appear, or the recovery is simply spontaneously sluggish, special drill out of the boat will remedy this being late with the hands, and so will facilitate the rest of the recovery. But it sometimes happens that a man is uneven in his swing forward, without any hang of the hands. In that case the reason will be found to be that he does not use all the muscles applicable for recovery of the body at the same moment, but uses them in detail, or omits some altogether. The recovery should be from muscles of loins, abdomen, and legs, the latter gaining their "purchase" from the strap. If a man sits with his legs tucked underneath him, he will still find that he has a certain power of recovery left in his loins, apart from that of the abdominal muscles. It is this power of the loins which is frequently neglected, either wholly, or for part of the swing forward. An illustration such as this will show the man what the power is, and so what he is wasting. Every ounce of labour saved on recovery tells a tale in a distance when racing, for not only is there exhaustion of the whole frame generally, but loss of reach, and so opportunity for the back (which may not yet be tired out) to do its work, is thrown away.

Faulty time is about as common a fault as can be seen in a racing crew, or even in a crew of good yet unpractised men. As a rule, faults of time are usually secondary. Some other fault exists to which they can be traced, and the primary fault, under one or other of the heads already discussed, must first be taken in hand. Swing and time go greatly together. Time may exist without swing by artificial means and special adaptation to circumstances, but good swing will hardly ever be seen for long without good time accompanying it, as a matter of course. The only exception is where there is a hang when forward on the part of some one, or a raising of the hands too high before getting into the water. If the stroke does this, the rest of his crew, if swinging with him, yet not sharing his fault, must necessarily hurry upon him. If his recovery and swing are so good as to excuse his instant dismissal for the fault alluded to, he must be taken in hand separately for cure. Similarly, a man other than stroke may swing with the rest of the crew, and yet be late, by too high a feather, or a hang when forward. If he is too soon (and the stroke is not hanging, etc.), the reason for this must be a "bucket" in the swing. This has been treated of before, and the causes whence it may arise. A hang when forward, or too high a feather, are best cured in a gig pair. The coach, by touching the man's hands as they come forward, can urge him to elevate them and to drop into the water at the right moment, and a few minutes' lesson like this ought to set him in the right way. A too high feather can also be cured, as formerly stated, by giving a mark on the back in front at which to aim the hands; or, if other remedies fail, by nailing a rough piece of wood on the stretcher, to knock the offender's knuckles if he dives them too low.

The faults so far enumerated do not belong to the most

important part of the stroke, the beginning. A beginner may think that, after all, a good tug at the beginning is worth all these niceties; so it might be if it could be ensured without them. At the same time, though directly they may appear to be of comparatively less importance, as not necessarily implying an absence of hard work, yet indirectly they bear greatly upon the amount of work done; for not only do they tend to exhaust him who falls into them, and to hamper his own action, in which he gets ready to do his work at the beginning of the stroke; but still more, they may make the boat lie so unevenly that neither he nor those with him can use their full strength at the important part of the stroke, even supposing that that part of the stroke may have no original fault of its own.

CHAPTER IX.

ANALYSIS OF FAULTS (*continued*)—NOT ROWING STROKE HOME—CROOKED SWING—WATERMANSHIP.

A LOOSE *button*, not pressing close to the rowlock as the oar stroke is finished, is a common fault with beginners. It is seldom, if ever, a spontaneous fault, but exists in connection with some other. Either the oarsman is screwing out of the boat, and so falls away from his oar, drawing it after him at the finish, (in which case the cure for screwing, already entered into, should remedy this simultaneously,) or the cause may be a slack finish, or a finish in the air, the oar not being rowed "home:" so long as the oar does good work it can hardly help forcing the button up to the thowl, but, if the pressure of work is taken off the oar towards the end of the stroke, the oar is as likely as not to leave the thowl; however, in such a case, to cure the looseness of

the button, attack the slackness of the finish which occasions it. Of this latter fault more presently.

But the button may be loose at another time, and more commonly so, viz. in the recovery. This may happen because the oarsman has screwed away from his oar at the finish, as before; but it often happens, without any perceptible screw, from sheer want of "watermanship." The pupil must be told to "feel" the rowlock all the time that he is recovering, without going into the opposite extreme of lying upon his oar as he swings forwards; a loose button during recovery affects the whole of a crew. The man who does so is necessarily swinging forward without any support to himself laterally, and gives helplessly with each roll of the boat. He also helps to make a lurch on his own account, for the alteration of the length of the oar in and out board, backwards and forwards, must, more or less, mar the time of the boat each time the shift takes place. The first requisite for learning watermanship (of which more anon) is to keep the button tight against the rowlock.

Not rowing the stroke home may come from weakness, in which case it will be unfortunate if a substitute cannot be found for the offender. Or it may come from a cramped attitude of finish, which brings the wrong muscles into play —*e.g.* a finish with the biceps: many a man who is strong enough to finish with the right muscles is not capable of rowing the stroke through in time with the rest of a crew if he uses the wrong muscles. Or the cause may be an overreach in the shoulders when forward: the shoulders, in such a case, have not only to bear the strain of the first part of the stroke at a disadvantage, but have also an extra distance to go back before the stroke can be finished with the proper muscles, and thus finish is weakened. Or the stroke may be not rowed out simply because the oar is taken out

of the water too soon, the drop of the hands having in such a case come before the hands have reached the chest. This may arise from weakness or clumsiness. If the latter, let the coach take his man in a gig, make him sit up as if at the end of a stroke, with oar square, and still at the right depth in the water. Then mark the spot on his chest which the oar then touches, and make him do his best to row the hands to that spot each stroke before he drops them. A fault of this sort is a great nuisance to those who row in front of the offender, for the odds are that, though he drops his hands thus too soon, he reserves the turn and completion of the feather to a later period, and, moreover, drops not suddenly, bringing out the oar like a knife, but gradually, thus throwing a lot of water aft, to strike upon the blades of the oars in front of him as they recover, and hampering their action.

Swinging across the boat is often seen without being accompanied by a direct screw. It may occur because the oarsman leans too much on his oar as he goes forward; or it may be that he does not sit square, but sits round towards his oar; or it may arise from uneven trim of the boat, not but that a good waterman will not allow his straightness of swing to be put out by such a minor *désagrément*. Sitting crookedly is, however, the most usual cause of the fault. A man may sit crooked from the bias of his head, which he has turned over his inside shoulder, in following the back in front of him. Sevens are prone to this fault, for they have to take time from a back that does not lie in front of them. Again, when a man is forward, the handle of his oar lies so much inside of him that it is impossible for both body and arms at that moment to lie true to the line of the keel of the boat. It is the arms that should give way, and should slant to follow the oar. They come square as the oar

reaches the middle of the stroke. But in trying to make the most of the beginning of the stroke, a man sometimes unconsciously sets both his body and arms square to the handle at the first catch, with a view of gaining more power, but loses leg work, and weakens the rest of the stroke by so doing. He must be made to sit square to the stretcher at the outset, to be content to have his body, therefore, not quite square to the oar handle at the beginning of the stroke, the arms following the oar, but not the body. This is best done by telling him for a season to set his head well over his outside shoulder, and to take time from the loom of the next oar in front of him, and not from the back in front. This will soon bring him straight. The mere weight of his head on the outside will prevent him from swinging across the boat, and so sure as he has cured his swing, he can again take the time in the proper way from the back in front of him.

Fouling the water in going forward not only checks the way of the boat between the strokes, but also causes a lurch of the boat away from the oar that so fouls if the water is struck with any degree of violence. If the stretcher has not been placed too short, the fault will be either that the hands do not drop sufficiently at the finish of the stroke, or that they are not shot out quickly enough from the chest so as to clear the knees before the latter begin to rise from the natural bend of the knees as the body swings forward. Insufficient drop of the hands, or sluggish recovery of the same from the chest, is then the cause of this fault, and the cure should be directed accordingly. (See Chapter VIII.)

Want of watermanship is a common fault, or rather incapacity, especially among University men. A good "waterman" should not only be able to keep time and swing, but

should always have command over himself and his oar, and not be thrown out by a lurch of the boat or rough water. It is astonishing what one good waterman can do for the rest of a crew. By sheer knack of "sitting the boat" he will not only save himself from being discommoded by lurches, but will preserve the trim, and so enable the very men whose faulty rowing has caused unevenness of keel to be unimpeded by the result of their own clumsiness. Just like a good skater, who can not only preserve his own balance, but also that of some tyro whom he has in hand, so is a good waterman among a non-waterman crew. He is constantly on the watch attentively to anticipate the least roll of the boat, and to "sit" against it before it has gone too far. And even if a lurch does come, instead of losing all command of himself and his oar, while the boat is off her keel, he accommodates himself to circumstances, keeps up his work and swing, and rights the boat while the tyros are lumbering and blundering in confusion. Many even valuable oars have not this knack of balance. They may themselves row too well to be the causes of many lurches in the boat, and yet be unable to counteract those lurches, occasioned by others, when they feel them coming.

Practice in a sculling boat or pair oar is the best school for watermanship, provided that the oarsman does not allow himself, meantime, to degenerate himself into feathering under water, or any of those faults incidental to raw pair-oar rowing, mentioned in previous chapters. University oars are so much tied down to eight-oared rowing that they have little time for pair-oars and sculls. The art of sitting a boat may be learned without such facilities, but practically it seldom is so, and Lawless, the elder Morrison, and Carter of Worcester, are the only individuals in my experience of Oxford rowing who, without having done much (if

any) sculling or pair rowing, had yet the knack of sitting a rolling boat. Long practice will certainly get good men, deficient in watermanship, to row so well together that rolling comes to an end; but a good waterman will sit his boat long before time and swing become perfect, and by thus counteracting rolling will enable those in the boat to get together in one third of the time that they otherwise would, for unevenness of trim, though caused by faults, enhances them while it lasts, and delays their cure.

Tideway amateurs are, as a rule, far better watermen. Their sculling and pair-oar practice, for which they have more time than University oars, accounts for this. Londoners who may be inferior in style to Oxford and Cambridge oars, are yet far more capable of sitting a light boat well and of doing their work in it without being all at sea by continual rolls. If a scratch crew goes out from the London Rowing Club, or with only two or three good "watermen" of that or the Kingston Club among them, the rest being University oars, to race one of the University eights, when at Putney in the spring, the scratch crew, though their oars are probably out of time, and their feather uneven, from want of practice, will be found as a rule steadier on the keel than the University Eight, which has ten times as much time and swing as the scratch crew. The latter from want of practice may be committing faults of rowing at almost every stroke which would tend to produce a roll, but these inaccuracies are provided against by the art of balance. Their trained antagonists far less often commit a fault which would cause a roll, but when that roll does come, they surrender helplessly to it, instead of anticipating it, or trimming the boat to save it. Especially when in a wash, or the swell of a steamer, does this art come into play. Of course, sitting the boat is an exertion, and

detracts from some of the power which could be expended on the stroke, but what power is thus left is enabled to be laid out to the best advantage on an even keel. It is of no use to have power in hand to expend upon the stroke if the boat rolls too much to admit of the expenditure.

It is hard to say how such a knack may be acquired; with some men it is an impossibility. Make and shape have a good deal to do with it; "breadth of beam" and width across the hips give a man facilities for thus learning the knack, and, in addition, he must be quick with his hands, ready to raise or lower them according to emergency, and especially active in clearing his knees, for if he once fouls them his own balance becomes crippled. The first thing a waterman has to do is to keep his own balance. Having succeeded in doing so, he can next learn to secure the balance of others. To do so he must always be on the look out for a coming lurch, must be quick with his hands, sit tight to his seat, and be ready to anticipate. The rest he must learn for himself; practice only can make him perfect. Beyond the most rudimentary sketch of position to start with, and a caution to be lively with his hands, book work can do no more good to him, nor even verbal instruction, than similar tuition would suffice to make a cricketer a good wicket-keeper, unless he possesses the first requisites of nerve, and quickness of eye and hand, and supplements these with careful practice.

CHAPTER X.

ANALYSIS OF FAULTS (*continued*)—BENT ARMS—WANT OF CATCH.

BENDING *the arms too soon*—a crying fault at all times—arises from more than one external cause. It may be due to want of culture of the muscles of back, loins, and legs, with which the earlier part of the stroke should be rowed. Till the superior strength of these has been utilized by practice and called into play, the tendency with most men, especially those whose arms are above the average strength, is to seek to do the work from first to last with those muscles which are "handiest," to wit, those of the arms. Again, it may be caused by want of watermanship, and the terrors of a rolling boat. The depth to which the oar is buried during the stroke tends to vary, of course, with inequality of trim of the boat. The natural instinct of an oarsman is to keep his oar at a standard level, or, at least, to protect it from going too deep, even if he does not grudge it going a little shallow. This evenness of depth must be secured (supposing the roll of the boat to be complete, and not checked at the outset by watermanlike "sitting the boat") by alteration of the level of the hands. A man soon finds that he can more easily adjust this level by letting the arms play up and down from the elbow only, instead of from the whole shoulder; and accordingly, the instant he feels a lurch coming, he bends his arms, that they may be the better prepared to adapt themselves to circumstances. The fault thus inaugurated soon takes a more definite form, and the arms become regularly bent, with or without a roll, the bend commencing either from

the first catch of the water, so that the arms are never really straight for work, or at least beginning long before the time due for the regular finish of the stroke. Premature or self-taught rowing in light boats is often at the root of this cause of the fault.

Again, badly laid out work may originate the fault. If a man honestly wishes to work, and yet finds his rowlock at a level, or his oar lying at an angle to the water at which he cannot get his body to do its work, he will try to do his best with his arms, which are all that remain available. The germ of evil thus soon remains even when the work has been put straight. For badly laid out work the coach is responsible, as said before.

Again, some men, in their anxiety to get sharp hold of the first catch of the water, endeavour to add to the force by bending their arms at the same time that they apply legs, loins, etc. This they would not do if they already made all the use available of the last-named muscles, for the strain would then be too great for bent arms to bear; but so long as the use of these muscles is but half developed there is scope for the arms to join in the catch, and for the time being the oar comes a trifle faster through the water during the first part of the stroke. But the result is not only that the arms soon tire under the strain of coupling shoulders to legs with bent joints—and a man who so rows proves no stayer—but still more, the arms, by thus taking upon themselves part of the duty that should belong to other muscles, prevent those other muscles from ever bringing themselves up to the regular standard; for they develope according to strain put upon them, supply following demand, and if the strain is thus eased by the arms development is no longer urged.

The best cure for the fault is to put the offender to work

in a very heavy boat—a gig, laden with sitters—one in which the strain of the oar is too great to allow of it being forced through the water by any other process than that of back, loins, and legs. The unusual strain, coupled with admonition, will soon keep the arms straight, and will at the same time develope the use of the dormant muscles. The boat should at first be so heavy that the pupil can actually put into practice the old theory of "lifting himself off his seat," standing for the instant against his stretcher, with body lifted fairly off his seat, by the simultaneous use of rigid legs and body driven well back. Such a strain as this will in an hour or two often bring his arms as straight as if he was hanging his whole weight for his life from a bar. When he has once thus got into the right train of action he will not fall back again, if his work is well laid out, boat steady, and stroke not too quick when he is once more restored to ordinary practice.

But when *one arm only is bent*, and not the other, the cause is totally different. It stands to reason that the inside arm has, being on a shorter radius, less distance to reach from body to oar than the outside arm. The inside wrist, therefore, should be slightly arched, and if the outside hand holds the oar in the fingers and not in the fist (see earlier chapters), and the hands are not placed more than three inches apart, this arch of the inside wrist should suffice to counterbalance the difference of length of radius, and to bring both elbow joints straight for the beginning of the stroke. If (*a*) the outside hand holds too closely with the whole fist, or (*b*) the inside hand is placed too far down the oar, or (*c*) the inside wrist is not arched, then something must accommodate itself to circumstance, and it falls upon the inside elbow-joint to give way, and bend so as to preserve the required length of reach from oar to shoulder. Any one of

these faults, or a combination of them, may be the cause of error. But if merely placing the hands and grasp in a proper position does not at once remedy the evil, the reason will be that the muscles of the arm have become so accustomed to the former postures and action that they cannot at once correct themselves, and if so, time will be saved by putting the pupil through a short heavy-boat course of work in the same way as suggested in the case of a bend of both arms.

Sometimes the inside wrist is arched to an extreme, though the elbow-joint is straight. This will arise from holding the oar too low down, so that the ordinary arch of the wrist does not suffice to equalize matters; or else, as before, from too close a grasp of the outside hand. The remedy must be accordingly.

All faults analyzed so far, refer to other than the all-important action of the *first part of the stroke.* A man who perpetrates none of these faults, nor suffers from their perpetration by others in the boat with him, will keep good time, swing, and form in rowing, row his oar through at a proper depth, finish and feather neatly, use his arms and shoulders properly, avoid rolls of the boat, and so will have, *primâ facie*, nothing to hamper him in making the proper use of his loins, back, and legs at the commencement of the stroke. But if, after all, he does not do so, he is useless for racing purposes, and though he may row in form, without this last-named capacity he will never row hard, at least, in a light boat. These faults thus analyzed are of minor importance in themselves, but their chief mischief is not so much what they directly detract from the "go" of the boat, as what they indirectly detract, by preventing the pupil who suffers from them, in himself or others, from being ready to lay his strength and weight properly on the first part of the

stroke in a light boat. If he fails in this main desideratum he is but a Pharisee at an oar, plenty of elegance is shown but no tangible use. To lay well and sharp hold of the beginning is a question of knack as well as of strength. The latter must pre-exist, the former must co-exist to enable the latter to be applied. Many a man who can row hard enough in a heavy boat, which does not go so light off hand as to leave no resistance to the oar if not caught sharp at the beginning, may yet be eventually unable to acquire the knack of putting his full force on instantaneously and at the right moment. A man who can "put the shot" well may yet be unable to throw a cricket ball with success against a school-boy, and the knack of getting well hold of the first part of the stroke in a racing boat holds a parallel to this. It comes to this:—Firstly, the power must exist, though latent; secondly, it must be developed by heavy boat coaching till the pupil learns to depend upon his back, loins, and legs for the main strain of the stroke; and thirdly, he must acquire the knack of putting the whole of this force, possessed and developed, into play at an instant's notice the moment his oar touches the water. Want of catch at the beginning by no means implies want of power of loins, etc., but simply a want of knack in using that power at the right time. How many an oar who could be valuable enough for races rowed in tubs, is useless for a light, keelless boat! To inculcate this catch is a hard task for a coach, but when he has once brought it out he will repay himself tenfold by the speed which he attains.

His first requisite is a stroke who can set the required style of suddenly throwing his weight upon the oar. He should teach it at first at a slow stroke, and the longer in proportion that he can make the time quick on recovery the quicker will be the drive of the oar through the water. For

this reason: If a man applies his strength to a certain given number of times in the minute, then the slower his oar comes through the water the faster is his recovery to keep up the normal and hypothetical pace of stroke. *Vice versâ*, the more time he allows himself to get forward and to reach out the less has he left to get his oar through in the allotted time, and thus he is driven to use extra force to bring it through the water. The adage already alluded to, of "lifting one's-self off the seat at the beginning," will explain to the pupil what he has to do, but will not necessarily enable him to put his theory into practice, when he comes to rowing in a light boat. He may be able to stand against his stretcher in a heavy boat, where the resistance is great, and can see that if he can suddenly apply the same sort of force in a light boat he will produce the same result; but it does not follow that he will ever acquire the knack of thus suddenly putting his weight on. The lighter the boat the harder does it become to put the theory into practice, and the more important does it become that such should be done. Provided a man has it in him, it is a question of time to develope first the required muscles, and then the knack of rightly using them. Three fallacies the coach must guard against: (1) The slowness of swing forward in proportion to drive through the water must *never become a hang*, or be gained at the expense of a hang, during any portion of the recovery. The body and hands should be always moving, though slower or faster according to the pace of stroke, *e.g.* of two crews, both rowing the same pace of stroke, one in a light and the other in a heavy boat, neither hanging, the crew in the light boat should occupy a longer time during the swing forward, and a shorter time in rowing the oar through than the other crew; but in both the bodies should be perpetually moving; in the lighter boat the stroke should

become more of a hit or drive, and less of a pull or tug. The primary action would be the same in each, viz. the removal of the weight of the body for the instant from the seat to the handle of the oar and stretcher, but in the lighter boat this would require to be done more suddenly and sharply. (2) The next fallacy to be avoided has been already alluded to, viz. clipping. It is easy to hit the water by rowing the first part of the stroke in the air, and so getting an impetus on the blade, but in such a case it is not the first part, but the middle of the stroke that is caught, the first part being non-existent (in the water). To avoid this the hands should be carefully shot out at the proper level, not too low. (3) Lastly, the stroke, when once caught, must be held, drawing it well through. When it is "dropped" after being carefully caught, it is because legs and body are not actively in concert, the body has been thrown sharply on, but the legs have not backed it up by rigid resistance. The legs, as explained in earlier chapters, must be ready to feel the stretcher and to stiffen against it the instant the body feels the strain of the stroke.

When inculcating a sharp catch to a crew the coach must not at the outset be disgusted to see bad time. Sharp motions are performed with less accuracy than slow ones. A crew that is taught to put its oars gently into the water will be able to do so with far more accuracy at first than one which sends them in with a dash. Similarly, in drilling military recruits, the slow motions are obtained in time, long before those which are sudden and sharp; but time will be acquired at last, and with it the *desideratum* of pace if the coach will stick to his text, and not be dispirited while he sees his own men "driving" like a peal of bells, while a rival crew, with a gentle sweep, raises and lowers its oars as level as a lady's fan. The work done at the first part of a

stroke, that is well rowed home, is what the coach must depend upon for pace. Yet, though it is in itself nine-tenths of the propelling matter of the stroke, he must not for that reason allow himself in his eagerness for its acquisition to be blind to the long catalogue of minor faults previously enumerated, which not only in themselves make a difference in the pace, but, still more, have an influence on the facilities for applying the strength rightly at the commencement of the stroke.

It will be seen from this that, though the power required in the muscles for rowing the first part of the stroke is first brought into play by heavy-boat rowing, which teaches the pupil to realize the fact of a resistance too great for his arms to overcome, and so to trust to his back, etc., still the knack of using this power suitably for a light boat can only be acquired in the light boat, and too much heavy-boat practice towards the last would deaden the "life" and suddenness of the catch in a boat. In the same way the use of dumb-bells and heavy weights would strengthen an arm for throwing a cricket ball, and would suitably prepare it up to a certain time, but to handle heavy weights on the eve of a contest would deaden the activity, and take the edge off the throwing. This parallel is adduced, that coaches, while following suggested remedies, may calculate for themselves, according to the time to lapse before a race, whether complaint is always worse than cure. If a man is utterly devoid of work of any sort at the beginning of the stroke, tub-boat rowing cannot spoil him, for he has nothing to spoil; but if he has some idea of a catch, though not enough, too heavy a spell in a tub, though it would do him no harm for the distant future, may yet throw him back in life and elasticity of body for a closely impending race.

CHAPTER XI.

SLIDING SEATS.

SLIDING seats were said to have revolutionized rowing when first they gained recognition. In one sense they may be said to have been revolutionary, in that they gave such an access of power that those who used them, even if they set at defiance ordinary rules of good rowing—especially of body work—were still able to obtain more pace than those of similar physical calibre, who, though rowing in sound form and with good body work, were confining themselves to fixed seats. This spectacle alarmed more than one good judge, and caused an opinion among such that, though pace undeniably increased with the new seat and action, form and good rowing, according to old-fashioned rules, would be a thing of the past. But this *prima facie* aspect of the change was soon altered. The fact was that the earlier expositions of sliding had not been good specimens of the art. Most of the new votaries followed it by light of nature, and not on scientific principles; but as the use of the slide became better understood, and a few good specimens began to display themselves, it was soon seen that good sliding was as far ahead in pace of bad and primitive sliding as the worse editions of the new art were ahead of the old fixed-seat style. Bad sliding will, as a rule, defeat good rowing on a fixed seat (assuming physique to be equal in each case), but that is no reason why sliding should not be so cultivated as to possess all the excellences of the best fixed-seat rowing, and yet to have in addition the extra action and power which is essentially characteristic of the "slide." If this principle is carried out the alarm of several retired

oarsmen, whose experiences of their own day entitle their opinions to the very highest respect, will, it is to be hoped, be found to be unfounded. It is very probable that they will—as has already more than one old hand who at first inveighed against the system—be content ere long to own that their first prejudices were founded upon the bad specimens of sliding, to the almost utter exclusion of good ditto, which they first witnessed, and which, after all, justified the opinions so formed so long as the standard remained at this pitch. On the other hand, steadily improving specimens (unfortunately still in a minority), which have more recently appeared of sliding rowing, show clearly that form can be as good on a slide as on a fixed seat, when properly understood and practised; and to this view many of the quondam opponents of the innovation are now coming round.

The same sort of theory was adopted by all heavy-boat oarsmen when light, keelless boats first came into vogue. They undoubtedly added to pace, but waterman-ship and the art of "sitting" a rolling boat was so little known that the light craft rolled helplessly, and form became at a discount. This was palpable in the Chester crew, who rowed and won the Grand Challenge at Henley in the first keelless boat ever built, in 1856. The form of the crew was bad, the oars "slobbered" along the water, but the pace was undeniable, and Oxonians and Cantabs alike abused the rowing of their conquerors. But they took counsel, for all that, from defeat, and rowed the next University race in similar ships. For the next year or two the form of College rowing was very bad, and spoilt by unsteady light-boat rowing; but in time it was proved that as good form could exist in light boats as in the old-fashioned keeled outriggers, and prejudice subsided as rapidly as it had arisen.

The proof of the pudding was found to be in the eating, and even bad crews adopting sliding seats at short notice, and with but an embryo knowledge of how to use them, gained at once such a palpable accession of speed, that it was plain, *à fortiori*, that if sliding with bad rowing could do thus much, sliding combined with good rowing could effect still more. Sliding on the seat had been practised for some years before the sliding seat came in. For sculling it had indisputably proved its advantages, but for rowing was it still open to suspicion. The strain of drawing the body up and down with the legs was not too great at the slower stroke which scullers use; but at the quicker stroke which is applied in rowing, quicker on the average by six to even ten strokes per minute, the strain upon the legs was too great to allow of its being sustained for any length of time. Renforth's Champion Four used to slide on fixed seats for a spurt, but not for any prolonged distance. The "John o'Gaunt" Four from Lancaster, that rowed at Henley Regatta in 1870, slid on fixed seats, and displayed great speed for half a mile, but at the expense of a strain on the legs which made them unable to "stay" beyond that distance. Somehow it never seemed to strike English oarsmen that, though the bugbear of sliding was confessedly friction upon the seat, the whole machine might be simplified by making the seat slide with the body, instead of the body slide upon the seat. To an American this adaptation of the principle is theoretically, we believe, due. But having thus simplified matters by making the seats slide, our American cousins did not appreciate their own invention. They had wits to see that if the body was to slide upon the seat, it was simpler that it should do so upon a false seat, itself sliding upon the real seat below. But they did not themselves appreciate the value of sliding at all upon a seat in any shape. This

may seem strange, but those who have noticed American rowing in this country, all arm and shoulder work, and but little use of legs and loins, can well understand that an appliance for increasing the use of the legs—limbs which they almost ignored in rowing, compared to our English ideas—would not meet in America with any great appreciation.

But the problem having been solved by those who had no motive for it, was observed by a north-country crew then in America, and was speedily put into execution on their return to England, and its value was practically proved in the great four-oared race that took place on the Tyne in November, 1871. J. Taylor, who had meantime perfected the wrinkle which he had recently picked up in the new world, persuaded his crew to adopt his plan. This use of the novelty was kept carefully dark to the last hour from their opponents, and the race, when it came off, was most hollow, owing chiefly to the use of the sliding seat. Chambers's crew was nowhere. A couple of sculling races on the Thames in the following spring more fully proved the utility of the sliding seat. It added power and speed without in any way detracting from powers of endurance, as had been formerly the case where sliding was practised on fixed seats. Not that those who slid (sculling) on fixed seats had been the worse or slower in the long run for so doing. Those who attempted it in rowing, to a greater extent than for mere spurts, had been the losers in the long run by it, for the reasons above explained. But the removal of the bugbear of friction at once established conclusively the value of the novelty, and from that hour it gained rapid recognition among rowing men.

The anomaly seems to be that, while the theoretic value of sliding, even on a fixed seat, had already been conceded, but

the difficulty in practical application had been the hindrance of friction, this now simple solution of the difficulty should have been unobserved by those who appreciated the system, and should have been left to the casual observation and detection of those who, though they did not appreciate "sliding," yet saw their way to the solution. Like Columbus and his egg, the solution once promulgated seems simple enough. Meantime, English oarsmen must own that they owe to Americans the solution, though not the application of the solution of the problem.

It was still further anomalous that in the first contest that ensued between the old and new world after the practical application of the invention, the country from which the invention first emanated should have pointedly ignored its use, and have rowed upon the old principle of fixed seats, while, on the other hand, their antagonists adopted the very invention which their rivals had invented only to throw aside. American rowing, deficient in leg work in the very essence of its style, was yet the means of teaching Englishmen how to make the best use of that leg work which constituted the main stay of their style. The race between the London Rowing Club and the Atlanta of New York is, of course, alluded to. The superior physique of the London men, and the further superiority of their style in all first principles of rowing, of form, time, reach, recovery, swing, work done at the first part of the stroke, and all such similar excellences, could no doubt have landed them victors with ease even without the use of the sliding seat. But some of the extreme hollowness of their victory was also due to their use of the sliding seat as against fixed seats. The fact that London could have won in fixed seats made some clubs for the time being fail to recognize the intrinsic merit of the sliding seat till Henley Regatta came, when the comparison of the two styles was

still further brought into notice. The London Rowing Club—first in the field with the new art—exhibited the best specimen of it, and, with a crew no better in physique and other details in rowing than the defeated London crews of years immediately preceding, secured, for all that, one of the hollowest victories on record for the Grand Challenge. Further, when at the eleventh hour other crews in practice at Henley adopted sliding seats, with but limited time and teaching to acquire the proper use of them, they instantly gained palpably on and over the course to the average of some fifteen seconds for an eight. This last practical illustration turned the scale against scepticism and opposition, at least among rowing men, and before the season came to an end hardly a race was rowed by oarsmen of any pretensions except on the new principle. But, as before stated, scepticism and condemnation were not easily got rid of among old retired oarsmen, who did not practically essay the system themselves. This opposition was not inexplicable. In the first place, many of the ablest seemed to confound the idea of the seat giving way with that of the stretcher giving way. It is curious, but still a fact, that many of the best oarsmen of their day held this confusion of ideas until they got into a boat for a few seconds, and had rowed on a sliding seat. Again, the execrable form which almost all the earlier specimens of sliding displayed naturally induced critics to say, "If that is 'sliding,' it is not 'rowing,' according to recognized rules. You may be gaining in pace, but you are abandoning style, and ruining rowing as an art of elegance." Time has shown that form is, after all, anything but incompatible with sliding, and though it cannot be denied that good form and style are less frequently seen just now than they were when fixed seats were universal, still form is gradually returning,

and as the practice of sliding becomes more and more practically understood, there is every reason to hope that in another season or two style will be confessed to have in no way deteriorated, nor rowing suffered as an art, by the innovation. Having thus briefly sketched the origin and rise of the use of sliding seats, analysis of that use must occupy a later chapter.

CHAPTER XII.

SLIDING SEATS—(*continued*).

THE simplest method of appreciating what is the action on a sliding seat is to recall for an instant the action of body and legs upon a fixed seat. On the latter the body does the main work of the stroke, but is supported and kept in the position necessary for this work by a rigid resistance of the legs against the stretcher. The length of that stretcher on a fixed seat is, or should be, the shortest at which the pupil can clear his knees with his hands in the recovery. Upon a fixed seat mechanical and physical power are to some extent in antagonism. The body would have more physical power the shorter the stretcher was placed, but if shortened beyond a certain point it causes the knees to be so bent that the hands could only clear them by raising the rowlock to a higher level, and so forfeiting a certain amount of mechanical power. Hence a compromise between mechanics and physique is effected, and the stretcher is placed only so short, and the knees are only so bent, as not to sacrifice mechanical power by placing the rowlock too high.

The amount of work done by an oarsman, supposing him not to vary for good or bad in other faults, and to apply

the same amount of pressure to his oar whether his reach is long or short for the moment, varies according to the length of his reach. On a fixed seat the body swings upon a fixed pivot. On a sliding seat the pivot itself moves fore and aft, while the body swings upon it, and the arc described by the body is correspondingly enlarged. The arc described on a fixed seat is circular, similar to that which the spoke of a wheel revolving, but not progressing, would describe. Now, if the wheel rolls while it revolves, it is clear that the axis must progress in a straight line parallel to the ground, while the spoke in question at the same time revolves upon the axis. If the wheel revolves upon its own circumference it is clear that the distance in a straight line which the axle progresses during a certain amount of revolutions, is equivalent to the linear measure of as many degrees of the circumference as equal the angle made by the spoke, before it commenced to roll, with its position when the motion was completed. The curve thus described by the end of the spokes will be a "cycloid." But it will be seen that, practically, the length of slide which a man is capable of is by no means commensurate with the linear measure of the arc described by his shoulders if he were on a fixed seat and swinging his full reach. But let us imagine two wheels concentric, the smaller one projecting its flange beyond the plane of the other. Let the smaller wheel roll along a projecting rim, say a wall, the larger wheel revolving with it, but not rolling upon its own circumference. Then when both wheels have revolved concentrically through a certain number of degrees, the larger wheel will have progressed, not the lineal measure of that number of degrees of its own circumference, but that of the same number of degrees of the smaller wheel's circumference. Its axis will have progressed this amount in a straight line, while the given spoke revolves

through the given number of degrees. The curve described by the end of a spoke of the larger wheel will be a "trochoid." This is practically the curve which the shoulders of a man on a sliding seat describe. It is obviously longer in linear measure than the curve which the body, swinging forwards and backwards on a fixed seat, would describe, and the increase of work done may be said to be proportionate to the extra distance travelled by the shoulders, provided the body is meantime proportionately supported by the legs to the same extent, taken at an average through the stroke, as it would be supported in a fixed seat. Now, on a sliding seat the legs at the commencement of the stroke, when the body is full forward, are capable of being bent far more than on a fixed seat, without interfering with the hands when they pass over the knees. By the time that the former reach the knees, the latter have lowered themselves, as the seat recedes from the stretcher, sufficiently to allow the hands to pass over without fouling them. Towards the end of the slide the knees are less bent, and consequently the legs give the body less support than they could do on a fixed seat, but at the beginning of the stroke they had more bend, and consequently more power than at the ordinary bend of a fixed seat, so that taken all round the legs on sliding seats may be said to exercise the same average support to the body as they do on a fixed seat, and the body, meantime describing a larger arc, does a corresponding extra amount of work.

Next, having shown the physical and mechanical gain of the sliding seat, to examine the best way of teaching a pupil how properly to use it. The strongest set of muscles that a man has in his body are those which extend his legs. Let a man try to stoop and lift a heavy weight in each hand from the ground, first by the elevation of his body alone—

his legs not altering their position; secondly, let him keep his body erect, and lower himself to grasp the weight by bending his knees only, and then raise the weight by straightening them, and he will find the latter far the more powerful action. This sense of superior power in the legs is at the root of much of the bad sliding rowing which the majority of those who practise it exhibit. A man on first essaying a sliding seat feels that the power with which he can lash out his legs and force his seat back away from the stretcher, is far greater than any which he was capable of applying with his body backed by simply rigid legs on a fixed seat. Pleased with the sensation of a novel acquisition of power in a boat, he too often falls into the error of making slide, and slide only, his *ne plus ultra*, exchanging swing for slide, not putting the two together. And he is more liable to fall into this snare, because the power of the legs to lash out is, as said before, greater than that of the body.

Although the reach of stroke that a slide on the seat alone —devoid of motion of body—would attain would be, from its very shortness, less effective in propelling a boat than a less powerful but longer stroke rowed by the body without a slide, yet when this slide comes to be coupled with a very small amount of swing, such an amount as would not be dignified with the name of rowing on a fixed seat, the two combined produce more propelling power than can be obtained from the mere body stroke on the fixed seat. The tyro then finding that he has distinctly improved in pace upon his old fixed-seat rowing, thinks that at once proof positive that he is sliding correctly. Again, if to the ordinary power of swinging back the body, and the strain which such action causes upon the shoulders in connecting body with oar, be added this extra power of the legs to propel the

whole machine as it swings away from the stretcher and so increases the reach, it is plain that the strain on the shoulders is considerably increased. It is a relief, when first learning to slide, to reduce the strain as nearly as possible to the standard of fixed-seat rowing, and by limiting the swing, and substituting slide for it, the strain is kept within bounds of comfort. With many men it must be allowed that the power of legs and back combined on a sliding seat is almost too heavy at first, if properly applied, for the "coupling" powers of the arms and shoulders, but before a week or two has passed nature will work her own remedy, and demand will create supply of muscle, if the strain is not shirked.

Again—a further cause for bad sliding: Oarsmen often fancy that sliding, because it confessedly increases speed, is, therefore, to be done for its own sake, apart from body work. The same men on fixed seats would not think of kicking out their legs before they felt the strain of the oar on the shoulders. They would apply the legs only as a support to the body, as depending upon the use of the body for being called into play, and not coming into play till the body had just commenced its work, and required support. But they throw this theory, which is analogous to that of proper sliding, to the winds, when they get upon a slide. They set to work at once to slide for the sake of sliding, and body work is accordingly sacrificed.

Now, the theory of sliding should be simply this:—1. That the body does its own work, as a *sine quâ non*, as heretofore on a fixed seat. 2. That the legs back up the body as before, but, instead of a mere rigid resistance as formerly, simply propping the pivot of action in its place while the body hinged upon it, the legs now do still more. They gradually, after they have commenced to support the body in the usual way, move the pivot of action farther back

by extending themselves, but do so not too fast to allow the body, still as before, to sustain itself by them, and to do its work. (If the legs are lashed out too fast the body cannot, by sheer want of power, do its own share of work in the same time. It gets behindhand. Nor could the shoulders bear the strain if the body completed its swing as fast as the legs are capable of completing their slide. The result is that, in such a case, the legs complete their slide while the body is but half through the swing. The remaining part of the swing has, therefore, to be rowed without any leg work to support it.) Thus, the fact of using the legs too violently at the commencement of the slide does not press the oar any harder against the water, even at the beginning, for there is a limit of strain which the body can stand. To meet this, if the slide moves too fast, the swing must during that time move slower, so that the shoulders may not move back faster than their capacity for enduring the strain of the oar will admit of. The extra strain, therefore, which the too sudden use of the legs entails simply takes the place of that strain which the body could cause. Meantime the body, unable to get through its work as fast as the legs can get through theirs, finds, when it wants to complete its own task of swing, that the legs have shot out too straight to render any support for the swing.

Let a man, therefore, throw his body on to the oar as before, when on a fixed seat; the instant he does this his legs instinctively come into play to support the body. Then, while he insists upon carrying out his original swing, let him gradually extend his legs, and shift the pivot of action backwards as he swings upon it, taking care that the pivot is never moved too fast to admit of the body doing its full and usual swing. In fact, the latter may be carried much farther back—indeed should be so—than would admit

of good recovery on a fixed seat; for the facilities for recovery which a sliding seat gives enable a man to go much farther back than on a fixed seat, and yet to gain rather than lose power by so doing. But this will more fully be treated of when referring to the proper action of recovery when sliding, in another chapter.

CHAPTER XIII.

SLIDING SEATS—(*continued*).

We pointed out in the preceding chapter that the too common fault in the use of sliding seats is slide either before swinging, or at such a pace that swing cannot possibly keep up with it. Also, that the correct use of the slide was first to throw the body on to the oar in the same way as on a fixed seat, with legs for the instant rigid to support the body, and then so soon as the legs begin to feel the weight of the body to let them gradually extend themselves, shifting aft the pivot of action while the body swings upon it, the slide being economized so as to last out the swing. If it is brought too rapidly to a close the swing must delay from sheer want of physical power to force the shoulders back in the arc of swing at more than a certain pace; and if the slide thus gets ahead of the swing, the remainder of the swing has to be completed with legs fully extended, and therefore no longer capable of supporting the body to do its full work. Slide and swing should be then (as soon as the latter has led the way by calling upon the legs for support) to all intents and purposes contemporaneous during the stroke.

Now, on fixed seats the recovery is exactly the converse of the stroke, *i.e.* the hands, which come in to the chest at

the end of the stroke, shoot out from it at the commencement of the recovery; and whereas the arms are rigid through the first part of the stroke, they are rigid during the last part of the recovery; so, to put it in another light, inasmuch as the body swings forward in recovery as far as it swings back in the stroke, then, at any point of that swing in recovery, the arms and body are in the same relative position to each other as they were in a similar point of the stroke—only the recovery goes over the ground the reverse way, the last being first, and the first last.

But *on the sliding seats the best form of recovery* is not quite a converse of the action of the stroke. The hands follow the same rule as on a fixed seat, viz. a quick shoot out, and the rest of the recovery performed with rigid arms; but, with regard to the relations between slide and swing, these do not repeat conversely the action of the stroke. In the latter the crucial point was that slide should not run away from swing, but in recovery it may with advantage do so. The body should not wait for the slide to complete its task, and then follow, but for all that it may allow the slide to hurry in advance of it, following meantime at a reasonable pace, and completing the swing after the slide forward has been completed.

The reasons for this are :—1. That the pace of the slide gives an impetus forward to the body, and so facilitates its swing on its own pivot, thus easing the strain upon the abdominal muscles, which in former chapters were stated to be the set of muscles weakest for their work that are called into play in rowing. 2. The body for its own recovery depends much upon the legs, and the legs give a stronger support to the recovery when bent than when extended. If, therefore, the slide is complete and the legs thoroughly bent before the body completes its swing forward,

that latter part of the body's swing is performed with less exertion to the abdominal muscles, and the staying powers of the oarsman are proportionately increased.

The recovery of the slide itself should be performed by contracting all the flexor muscles of the legs and feet simultaneously—the ankle and knee should work together. The mere bending of the knee, so long as the foot is kept flat to the stretcher, will suffice to bend the ankle-joint, even if the muscles that work the latter are passive; but the ankle should be active, and not merely passive, and should take its own share in the work of the slide.

The *length of the stretcher* should be as short as can be used while allowing the hands to clear the knees as they pass each other during the stroke. The hands, by being shot out quickly on the recovery, get in front of the knees before the latter have come to an acute bend, and at the moment that the water is caught at the commencement of the stroke the knees should be actually higher than the hands by some three inches. *The legs should never be straight at the end of the stroke;* there should always be some bend left at the knees, not only to afford proper support to the body at the end of the swing, but also to facilitate the recovery; for when the knees are straight the mechanical power of the flexor muscles is at a "dead point," and the extra exertion of getting the legs under way is not compensated for by any work gained by the extra length of slide to the point when the legs are thus straightened. Whereas, if the legs are slightly bent at the commencement of the recovery the muscles work to greater advantage, and the flexion is completed with greater ease.

In teaching a crew how to slide, the coach must, as in former cases on fixed seats, himself superintend the placing of the work of the men. First, the *slant of the stretchers*

should be considerable. Even on fixed seats stretchers are often too perpendicular. On a sliding seat, with the extra bend of the ankle-joint, a good slant is more than ever imperative; if, as is usual, the boat-builder is at fault in this respect, the coach must see that each man has thick heel pieces of wood to place the foot at the proper angle, which may be about fifty degrees with the kelson. Secondly, the straps must be tight, and, of course, grasping both feet, not across the tips of the toes, as many builders set their straps, but crossing the foot at the root of the big toe. Thirdly, he must himself arbitrarily regulate the length of each man's stretcher, and insist upon its being short enough to raise the knees well above the level of the hands when forward with the oar in the water. Fourthly, he should teach his men to keep the knees well apart, as on a fixed seat. Too many oarsmen on a sliding seat place both knees together. So far as the legs go, they gain more power by so doing, but the body cannot get so well forward, nor do its work so strongly with closed as it can with opened knees, and, as before said, sliding must never be made an excuse for abandoning the proper action of the body. Fifthly, the oars used must be longer than those for fixed seats. The ordinary oar handle will, with the extra reach obtained by sliding, be found to lie too far inside the body at full reach forward and backward by some two inches. If the oar is thus too short, the oarsman cannot swing well back, and yet keep his inside hand both on the oar and yet flat to his ribs and doing its proper work. The oars, therefore, must be lengthened in-board to allow for the extra reach, and with that addition a certain proportionate length out-board must be added, else the oar will come too easily through the water.

Then, having set his work right, let him be content to

commence with a three-inch slide, having stops of wood to block the slide from running its full length at first. If the crew have only a short slide to master, when learning the first action, they are less likely to make the slide the *ne plus ultra*, and will find it easier to combine slide duly with swing. The short slide thus allowed to start with should be, to all intents and purposes, the fore part of the slide, so that the legs, when the slide is over, are, after all, little, if anything, straighter than they would be on a fixed seat. We say to all intents and purposes, because in first taking to sliding the unusual bend of the ankle-joint causes a cramped feeling in the legs, and as this wears off the pupil will be able to bend his legs still more, and to slide forward farther than he could at first. But the earliest slide should be from as far forwards as the pupil can comfortably slide to the stop that checks the slide back. When this extent of slide has been mastered, say at the end of ten days, more or less, let another inch back be added, and in turn mastered, and so on, till the use of a nine-inch slide is acquired, without in any way sacrificing slide to swing. If sliding had been learnt like this by modern crews, the feeble exhibitions displayed as a rule—mere piston action of the legs, without swing of body, would have been probably avoided.

Though a nine-inch slide can be properly used in good practice, it by no means follows that a coach should feel himself bound to try to work a raw crew up to use of this length for their first race of this sort. All depends upon the time available, and the proficiency of his pupils. It is better to make sure of mastering a certain amount of slide than to risk spoiling all by attempting too much. More pace will be gained by a six-inch slide, combined with good swing of body, than by a nine-inch with swing abandoned;

and the former will not sow seeds of future bad rowing, as will the latter.

The men may be taught to *swing well back*, farther than they would on fixed seats; for, as explained when treating of the recovery in this chapter, the slide so facilitates the recovery of the body that the strain upon the abdominal muscles, which was the difficulty on fixed seats, no longer exists as a reason for not going far beyond the perpendicular.

Whatever may be the amended style of sliding a few years hence, it is certain that at the present day a coach will find as much custom in curing bad sliding as in teaching the art *de novo* to those who have never essayed it, and he will find the former the harder task of the two. Badly laid-out work, too long a stretcher (possibly because too perpendicular to admit of sufficient bend of the ankles), or an oar too short in-board, may be in some cases the main cause of bad sliding, and alterations in these respects may go a long way towards amendment. But if there is time, in the case of a crew or a club that have got into a thoroughly vicious style (such as Oxford, with but few exceptions, exhibited in 1873), the best way to commence cure is to go back for a time to fixed seats, and so recall to the men the standard use of loins and back, which they have been neglecting for their new toy. A good spell of fixed-seat rowing, followed by a gradual re-introduction to the slide—inch by inch—will teach combination of slide and swing. The difficulty, however, with offenders of this class is, that, unlike mere tyros, who feel their own ignorance, and try to learn, they are for the most part oarsmen of a certain amount of proficiency, on fixed seats at least, and prone to believe that they are not such fools as they look. Also, the undeniable sensation of novel power which a piston-like action of legs, void of swing, gives, and the fact that

even bad sliding obtains more pace than good fixed-seat rowing, go far to delude such men that they are, after all, in the right. It is only when they feel a practical comparison between really good sliding and their own hybrid style, that they become enlightened. The first principle that we laid down for a coach was to keep his temper, and he will need the faculty more than ever when attempting to mend bad sliding in those men with whom a little knowledge is dangerous.

CHAPTER XIV.

SCULLING.

THE designation of these chapters is hardly consistent with the comparatively minor space which sculling must occupy alongside of those chapters which have been devoted to oarsmanship. As when opening the subject of rowing, an elaborate description of what sculling is, *ab initio*, would be waste of time. Those who do not know it on the water would not learn it from paper.

If a man has a fair idea of rowing, but has never handled sculls in any shape, we would advise him to commence thus:—1. To keep clear of a sculling boat for the first day or two. 2. To hold in equally pious horror "hack" boats of any description, especially "whiffs." If bad style is engendered by badly laid out work at the oar, it is equally, if not more so, at sculls. When handling an oar, a tyro has some chance of being coached, and of having his seat, rowlock, stretcher, and oar examined for him; but when "on his own hook" in a sculling boat he stands but little chance of such superintendence. And the worst is, that from his very inexperience he is no judge of what is good for his own peace—it is hid from his eyes. If he has a

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good opinion of himself, he is likely to lay all faults of his own clumsiness to his tools; if modest, he may assume his tools to be perfect, the fault of discomfort to be his own, accommodate himself accordingly to circumstances, and so lay the seeds of faults that will mar his style and pace for some time to come.

However, that he may get an idea of what this "feel" of sculling work should be, uninfluenced by unsteadiness of craft, before he commits himself to a wager boat, let him look out for a good outrigged gig in which to commence operations. A "dingey" he should fight shy of; she is so short that when pressed she will hold no "way," will turn too easily, and from the fact that she goes no faster for a long stroke, may teach him to row short from the outset. Let him see that the thowls of his gig are "proud" (raking forward), and devoid of grooves in the upper portions of the thowl, worn by the upper angle only of the loom of the scull pressing the thowl in a feather under water, which is too common among scullers. Let him next see that his stopper is far enough off from the thowl to prevent his sculls from "locking" in the rowlock when forward. This is a necessary precaution. Few gig rowlocks are wide enough between thowl and stopper for even full reach in rowing, without some filing away of the stopper, and a wider rowlock is needed for sculling than for rowing, from the sharper angle which the scull, compared to the oar, makes with the rowlock (when the body is forward), from the fact of its being shorter inboard. If the tyro confines his reach in his first essay to that suffered by narrow rowlocks, he will, when he comes to reach out more fully in the wider rowlocks of a sculling boat, find his hands not "together" in the increased reach, but one getting into the water before the other.

The best way to hold his sculls, so as to avoid cramp of wrist, and to prevent his hand shifting away from the end of the scull when greasy with perspiration (thus losing leverage), is to let the upper joint of the thumb "cap" the end of the handles. Let him put his stretcher as short as he can possibly bear it, and of course commence with a fixed seat, even if he has been ever so proficient in rowing upon a slide. He will have enough to do in thinking how to get his hands in and out of the water together, when commencing sculling, to have any spare attention to bestow upon sliding, and if he practises the latter without thought he may breed faults for which he will be sorry hereafter. Let him choose a pair of sculls that lie true in the rowlocks, and, if possible, let him get a proficient to test the true bearing of the sculls for him before he uses them, that he may know whether unevenness in their action be the result of misfortune or of fault. The amount that they should overlap at the hands is to some extent entirely a matter for his own taste, but if he has no taste in the matter he will find five inches a safe medium.

Let him spend his first two or three days, if not more, in long steady grinds in his gig. The same principles that he learnt in rowing—of straight arms when the water is first caught, use of back, loins, and legs—he must still put in force. But he should keep his arms straight for a longer distance of swing, and may go much farther back before he begins to bend his arms and to bring them in to his body than when rowing. As his arms begin to near the body he may bring himself up by them, pull himself up to his sculls at the finish, a thing which with his oar he should not do.

The reason for this variety in recovery between sculling and rowing are: (1) That the body having gone farther back requires some extra aid in the recovery, to ease the

abdominal muscles in the longer distance that they have to convey the body. (2) The easing of the weight of the body from the loins, by thus pulling it up to the sculls at the finish, prevents the boat's head from being "pressed," and her way from being stopped. A sculler should endeavour to do as much work as he can with stiff arms, his body and loins doing the main duty; he may go back almost to his full available distance before he bends his arms at all; if he were then to continue to go back still further, all the time that his arms were coming in to the body, he would go back too far for his powers of recovery. If he were to stop his body for his arms to overtake it, he would be during that time making no use of his body, and wasting time with it; but by commencing recovery with the body before the arms have come home he economizes his body, wastes no time, eases his recovery, and prevents his boat's head from burying.

So much for the action of body and arms; his hands must require special attention. He must try to time them to the tenth of a second, that the sculls shall fall into the water simultaneously, and shall leave the water, with wrists simultaneously turned, at the same instant. If he does not acquire this knack in the gig to some extent he will find himself all abroad in a wager boat. So soon as he has some confidence in the even action of his hands (which long and painstaking rows will best attain) he can go into a wager boat. When first he so promotes himself he must call his watermanship into play. He must "sit" the boat for himself; no one else will do it for him. He must not trust to his sculls to steady the boat on the recovery, nor let them slobber along the surface of the water to preserve balance. He must drop his hands and lift the sculls boldly out when the stroke is finished. Roll at first he will, but

for this he must make up his mind, and must try to counteract it by balance of his body, and by sitting tight, not by sliding his sculls along the surface of the water to steady himself. If he does this last he may counteract unsteadiness, but will never acquire the art of balance, nor cure the faults that caused him to roll—will rather add to them by feathering under water, and will lose inches and inches of shoot at each stroke by thus fouling the water.

Too much stress cannot be laid upon truly laid-out work and sculls to start with. Half the crab-like contortions that junior, and even senior, scullers display (one arm bent before the other, one shoulder shrugged, one arm longer in the reach than the other, or one rowed home, and the other finishing inches away from the chest), may be traced to uneven sculls or work which prevent the body from throwing equal weight upon each arm. It is true that many scullers spring at once to a wager boat without an apprenticeship in a steady gig, but they do not become proficient any sooner for so doing, and many a sculler in a wager boat who cannot get his hands in time, and spoils his style and steadiness in consequence, would obviate half his difficulties if he would condescend to do two or three long rows in a well laid-out gig, paying special attention to the uniformity of his hands.

Steering is an all-important accomplishment for a sculler, not only to save distance, but also to avoid risk of fouling when he comes to racing. If the course is pretty clear the sculler will soon learn not to trust to looking round more than to get his boat's head straight for the reach of water in which he is, and then he will keep his eyes on the stern of his boat, and regulate that by some distant object ashore, as an artilleryman lays a gun, so as to keep the straight line in which he has laid his boat. It stands to reason that he

shortens the reach of the arm on which side he turns his head to look behind him, and loses his power. As he gets to know a particular course well, he will fall back each time upon the same steerage points for guidance, and only those who have sculled to utter distress can appreciate the gain of being able to take up, almost by force of habit, and without any exertion of calculation in the mind, each necessary steerage point in turn over a well-known course.

As he watches his boat's stern the sculler will be able to judge of the evenness of action of his hands. He can see whether they work evenly throughout the stroke, or whether one rows the other round in the first part, and has to slacken to allow the other to bring the boat straight in the finish of the stroke. If this is done, he will see that not only does he lose ground by the boat's wake being thus an elongated Z at each stroke, but also he loses power by one hand working weaker than the other at one time, and the other at another. If he can bring the hand that is weakest in the first part of the stroke up to the level of the other, he will gain not only in this, but will also no longer have to waste strength with the other hand at the finish. In his steering he must be on the watch to correct the first beginning of deviation from his course, and to adjust the work of each hand accordingly. In time he will learn to keep his stern-post true to his steerage object, without having constantly to awake to the consciousness that he is many degrees out of his due line, and so having not only to waste strength in rectifying it, but also to lose ground in returning to his lost track.

Steerage apparatus now takes much of the labour off the arms of righting the boat in its course; but a tyro will learn best to work evenly with both hands if at first he dispenses with such apparatus. The power of rectifying unevenness

by a touch of the foot upon the steerage lever tempts many a man to be careless of studying even work of both hands, which would obviate constant appliance of the rudder. Besides, the best fitted rudder must more or less "draw" the water, and so check "way;" and so on smooth water a sculler who can use his hands evenly, and can steer a good course without it, nor has many tortuous corners to navigate, will go faster without a rudder than with one. Further details of sculling will occupy the next chapter.

CHAPTER XV.

SCULLING—(*continued*).

ALL that holds good of rowing on a sliding seat applies equally to sculling. The first thing to be acquired is use of body, backed up by rigid pressure of the legs against the stretcher. When this has been attained on a fixed seat, the action of the legs is changed from a rigid resistance to a gradual extension of the limbs, and thus the slide is formed. It must be borne in mind that the slide should depend upon the swing, and should be restricted so as to be co-existent with it. If the slide is done too rapidly, the swing has to wait till the slide is over—for the *physique* of the body is unequal to the task of driving the back through the full length of its swing in the same short time that the legs are capable of shooting themselves out over their minor extent of reach, nor could the shoulder-sockets stand the strain. The body, therefore, has to wait—if the slide hurries—and to do its work when the legs have done theirs. In that case there is no longer sufficient support left in the extended legs to enable the body to do its full share. The

result is that it swings back comparatively feebly, and is unable to go beyond the perpendicular.

Length of stroke tells in any craft, but more in a sculling than a rowing boat. The longer the stroke the less frequent repetition it requires, and, therefore, the slower can be the swing forward. This latter not only tells upon the *physique* of the sculler, by sparing the strain of recovery, but it also tells upon the travel of the boat, for a quick rush forwards ducks the stern under water, and causes the boat to lose way, not only from being out of the plane of the water, but also from the weight of water lying for the instant upon her canvas, which increases "the surface resistance" (or the extent of superficies of the hull, which is brought into contact with the water, and so into friction with and attraction to the particles of water). This may seem an infinitesimal difference, and a tyro may think that water, being so smooth, can exercise no friction. But any yacht-builder will endorse the theory of surface resistance: and that of attraction is palpable from the manner in which water adheres to a boat after it is lifted out of water. Thus, even supposing it were no greater physical exertion to row a certain number of shorter strokes, which in their combined measurement of sweep equalled a certain number of longer and slower strokes (a supposition which every oarsman knows to be impracticable), still the longer and slower stroke would command more pace of the two, for the reasons above assigned.

It is possible to scull a much longer stroke than can be rowed. The reach forward of the body has the same approximate limits in each case. If anything, a sculler can reach his hands an inch or two farther forward than the oarsman, for the latter just at the end of his reach has his handle a little inside of him, his arms sloping across him, and not square to his body. The sculler is not thus

cramped; his arms shoot out square to his body on each side. But it is in the swing back that the sculler gains mostly in reach. If the oarsman goes too far back before bending his arms, the end of his oar handle lies inside his body, and his power of finish, especially with the inside arm, is hampered, for the forearm can then no longer be parallel to the body. If his oar were made long enough inboard to enable him to go as far back as a sculler, it would cause his arms to be lying outside his body when the oar was at right angles to the gunwale, the period of the stroke when the mechanical power is greatest. A sculler, on the other hand, is always able to throw his weight in a direct line; his hands, though nearer or farther from each other at various periods of the stroke, always bear a strain corresponding in direction in the case of each, *i.e.* the joint direction of the two powers, right and left, according to a "parallelogram of forces," would be in a line with the keel of the boat. Thus, however far the sculler goes back, his hands jointly never pull out of the line of the keel. So that it comes to this: the stroke of the oarsman is limited in length, because, beyond a certain angle of the oar with the gunwale, the body and arms cannot do their work in the plane of the keel nor in the same plane with each other. The stroke of the sculler is unfettered in this respect, and is limited eventually only by mechanical requirements (the limit of the angle which the scull can make with the thowl, without locking) and by the demands of recovery.

This latter, even on a fixed seat, is easier work than in rowing, for the body when far back can pull up to the sculls. In rowing, as said above, this pulling up is not practised, because (1) with a medium swing back it is not wanted, and the body should continue to go back till the hands overtake it; (2), with a swing back as far as sculling

admits of, an oarsman would be unable to recover himself squarely by his oar handle, for it would be inside his body, and out of the true plane. If, therefore, recovery is a matter of greater ease in sculling than in rowing (compared to the length of reach), even on a fixed seat, it is obvious that on a sliding seat there should be less difficulty in the return swing. The fact that the arms of the sculler are always jointly working in a line with the keel, and thus he is enabled to take a longer swing than in rowing, explains why, as a matter of practice, double sculling is faster than pair-oar rowing.

Since, therefore, the body should swing farther back in sculling than in rowing, and slide should always be extensive with swing, it is obvious that the legs must extend themselves more slowly in sculling than in rowing, else the body will have no leg-work left to drive it back the latter portion of the swing. As in rowing, the slide should never be so long (or the stretcher too far from the seat) as to allow the legs to be straight at the end of the slide. If they are allowed to straighten, not only is the latter portion of the swing weakened, but the powers of recovery are also hampered, for the muscles of the legs, when straight, being "at a dead point," start at a disadvantage.

The sculler should be careful not to let the finish of the stroke with the arms be anything like a jerk. As said above, the body should be just commencing to recover during the last part of the bend of the arms. If the body waits for the arms, and the latter come into the chest with a "swish," the only result is that the boat's head is buried, and "way" lost. In the preceding chapter we said that five inches was a safe medium distance for the handles of the sculls to overlap on a fixed seat. On a sliding seat the sculls, like oars, should be a trifle longer inboard, and, of

course, in proportion outboard. This is to prevent the hands being too far apart at the extreme reach forwards and backwards. Sculls for a sliding seat may be as much as six or six and a half inches overhand, if the sculler makes sure of going back till his hands clear his ribs at the finish on each side of his body. If he does not go so far back as this, then he will do better with less overhand sculls, but with the first-named work and action of body he will command most pace. A sculler may take this as a rule, that his arms should remain straight and his body be going back till after his sculls have "opened" in the swing back, *i.e.* till they are no longer overhand. This he can only secure by keeping a judicious reserve of slide and leg-work up to the last.

As to which hand to row uppermost doctors disagree. For mere speed in straight courses it matters little. For practical purposes, perhaps, the left plays best uppermost, for it frees the head to look over the right shoulder, which in manœuvring the majority of corners on the Oxford river, the Cam also (we think, but stand open to correction), and the Poplar point at Henley, is the side which requires most observation. The side on which the head turns is the weakest for the instant, and, therefore, should, if possible, be the side which is being rowed round.

Since the shorter the stretcher is, the more power will be attained, it is necessary that the hands should clear the knees on the recovery as soon as possible, else even in smooth water they will not get by afterwards. When once the hands have got in front of the knees the slide forward should, as in the recovery of rowing, be completed rapidly, in advance of the body, thus giving an impetus to the body forward, and easing the strain of the abdominal muscles in swinging the body forward the last part of the reach. The

arms should shoot to full stretch as quickly as they can after the hands have cleared the knees. This throws the shoulders back, aids respiration, and is also the most advantageous position for the arms to carry the weight of the sculls forward. No pair of sculls is ever the worse for an ounce or two of lead let into the butts of the handles. Any sculler who tries this will be surprised to find how it eases the weight of the sculls outboard, without adding any perceptible burden to the cargo of the boat. When forward the hands will be much lower than the knees. In the swing back the hands should, with work and stretcher properly laid out, pass over the knees just at the instant when the knees have lowered themselves sufficiently to admit of the passage. It stands to reason that they cannot pass sooner, and if they pass later, it shows that the slide has been too rapid in proportion to the swing. (Analysis of true and best measurements for work, both for sculls and oars, will occupy later chapters.)

No sculler is a proficient till he is at home in rough water and work. To manœuvre the former he must be able to drop his hands well when required, and to drop them evenly and simultaneously, else his trim is spoilt. A good sculler can go through rougher water than oars can, for the drop of the hands elevates the blade of a scull more than that of an oar. If water is very rough, a sculler must judge for himself whether he must not drop his hands and get them in advance of his knees before he commences to bend the latter at all. His recovery is slower for so doing, but it is surer and freer from concussion with waves.

In starting on a strong tide, with the boat's stern held, the sculls must be flat to the water till the word is given, else the rush of water against the blades will strain the boat, and perhaps pull the sculler off his seat. Even with

sculls thus flat to the last, it is difficult to turn both so simultaneously that each should catch an equal amount of water the first stroke. If they do not, not only is the boat's course marred at the outset, but the form of the sculler is hampered for the next few strokes, and there is an off chance of an upset even for a good sculler. It is safer, and does not lose many feet of start on the first stroke, not to be full forward at first, to go forward a few inches more after the word to start is given, and then to commence, with evenness of sculls insured. In comparatively still water this caution is unnecessary.

A sculler should get away briskly, but it is bad policy to push for a lead at the price of forcing the pace beyond the sculler's best average speed. One authority in sculling recommends quick starting, for the sake of giving an opponent the wash. Under the new laws of boat-racing water is taken only at peril, and such tactics as crossing and washing do not therefore pay so much as they formerly did. But even under the old rules, the best scullers of the last dozen years have been content to bide their time and to go their own pace. Casamajor always took a lead, it is true, but as he had the speed of all his opponents at the end as well as the beginning of the race, it was but natural that he should lead at first as well as at the last. Others of note who succeeded him, if confident that they had the pace somewhere over the whole course, but were not sure of having the best of it at starting, never allowed themselves to be flurried or forced off their pace by a temporary lead of an opponent. To a good sculler (of good pluck) who can sit his boat, the wash of an opponent does but little comparative harm, far less than would a burst at starting at a pace which he could not maintain. A sculler will always improve himself by practising sculling in the wash of another.

Since a sculler should endeavour in a race to select his best pace for the whole course, and not to be troubled at a lead, it is necessary for him to know almost instinctively what his best pace is. This he will learn if he times himself day after day at various points over his course, and notes whether, as he increases his speed of stroke, his times from point to point bear the same relative proportions to the time of the entire course. He can thus judge whether extra speed at the outset sacrifices staying powers further on. He must only judge *proportionately* of his distances and times, for wind and stream may make the time of the whole course vary from day to day.

In sculling on a tide, against a head wind and rough water, it should be borne in mind that a sculling-boat, being by its light weight easily influenced by wind, and holding less way and momentum than a larger boat, suffers more by opposition of wind and waves in mid-tide than it loses by loss of stream at the more sheltered sides of the river, where stream is weaker. On the Putney course pilots are in vogue for scullers, and fairly so, else strangers to the tide-way would be seriously handicapped against *habitués*. They steer from cutters astern of the scullers. This takes much trouble off the sculler's hands. He has simply to note the point on which his stern post lies when his pilot signals him "all right," and to keep it there till further notice. The simplest mode of piloting is with a white handkerchief, held out right or left, according as either scull requires to be pulled harder, and over head when the course is true. Some signal, such as taking the hat off, should be agreed upon for "Look after yourself," which may be necessary if the pilot is too far astern of his man, or some obstruction in the course is beyond safe pilotage. A pilot on the bank is more nuisance than use to any decent sculler. He

cannot tell the sculler of the first small inaccuracies which spoil his course, and constant hails to pull right or left do more harm than good, for they can be only founded on conjecture. The sculler can better take care of himself. Only if he has gone some palpable "mucker," such as running into the bank or an obstacle, can a pilot on shore give any information worth having. But a coach on shore, if he can be heard above the din of partisans, can do a sculler good by reminding him of his form, which in excitement he may be neglecting to the detriment of pace.

THE END.